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January 1988

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Vol. 3 No. 2 January 1988

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Sub: 0000 00000 (Editorial)
0000 00000 (Advertising)
0000 00000 (Subscription)

Sub: 0000 00000 0
Circulating No: 11 00000

Telephone: 01 234 0001

Personal Mailbox: 01 234 0001

Fax: 000 00000

Published by

Atari User Publications Ltd

Atari House, Attercliffe Park,

London Road, Nottingham

Nottingham, ENGLAND NG7 1NR

ABC

000 00000 0 000 0000

Subscription rates for

12 issues, post free

(UK): £6

(US): Europe £10.00 (incl)

(US): Overseas \$14.00

ISSN 0000 0000

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It has been voted the 1987 microcomputer of the year.

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In addition to BBC Basic, 3 high-level languages such as C* and Pascal can be used for specialist applications like exploiting the computer's outstanding power, graphics and speed.

The huge potential of Archimedes doesn't stop there. The 110M with its built-in 1M cache can run 1.5m 1.2 M* (1.5M) 1.2 M* 1.2 M* and also a popular business program is available under MS-DOS.

With prices starting at £795 inc. VAT for the 505 with more memory and rising to £1095 inc. VAT for the 512M with cache memory, the Archimedes 500 series represents unparalleled value for a computer system of such capability.

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Games systems selling well

SALES of Atari's VCS 2600 and 400 game-console computer systems have been high despite a TV advertising campaign setback.

The problem arose when the Independent Broadcaster's Authority objected to an advert scheduled to be shown during prime children's watching time.

One reason given by an IBA spokesman is that the advert put forward by Atari did not comply with its code of practice. The reason that

Atari seems to have been in breach of rules "Children's ability to distinguish between fact and fantasy will vary according to their age and individual personality."

"With this in mind no unreasonable expectations of performance of toys and games must be encouraged by the manner in which any background or special effects."

By the time Atari had produced another advert to

promote its machines for the Christmas market all remaining slots had been sold, leaving the company well and truly out in the cold.

Atari spokesman Peter Walker refused to comment about the ad content or problems with the TV campaign. But he did say that sales of the games' computer systems are high and do not appear to have been affected by the lack of advertising.

Record turnover

ATARI has achieved record results in the third quarter of its financial year.

Sales were \$80.4 million - a 24 per cent increase over last year's third quarter when sales totalled \$65.0 million.

Income was \$8.3 million, compared to \$4.8 million, a rise of almost 80 per cent over last year.

Sales for the first nine months stand at \$216 million, 26 per cent up on last year's \$169 million. Income has risen 26 per cent from \$25.6 million to \$40.4 million.

The very devil to pay over games

HUBBLE bubble-bait and trouble for Red Rat Software games Little Devil and Nightmares.

They have been banned in France and Italy because they are considered to have sexual connotations. A major UK distributor refused to handle the games in this country for similar reasons.

Red Rat, director Harry Mueller told Atari Corp: "I don't understand it. Little Devil is nothing more than a harmless arcade game with no evil intent at all."

Nightmares contains all the ingredients of a classic fairy tale with no harmful additives or colloquial language to worry about.

"If the games were being sold to children to start adding with magic beans or something like that then there could be a justified



complaint. Both titles were reviewed in the December issue of Atari User.

Red Rat's Mike also reviewed Little Devil and "I was also warned not to be game at all."

To test the opposite situation, Atari sent the Little Devil along good by trying to free test units and break out of hell himself.

Simon Distribution had originally banned both games, but has relented on the title of Nightmares.

Their spokesman John

Wendley told Atari User: "We are now handling Nightmares - but Little Devil remains on our banned list."

"We consider the title unsuitable for general distribution and refuse to stock it for the simple reason as we do not stock Lucifer's Peak, Lucifer's Gorgone or Phobos or King Poker."

Ray Nader, The French and Italian and Belgain Conventions are all judging the game by its cover - I doubt if any of them have played the game at all.

Weather outlook brighter

WILL so bright which offers Atari users an opportunity to become weather forecasters in being upgraded to a professional standard.

Thanks to WeatherLink, all Atari owners will soon be able to pick up the same satellite pictures as the Met Office experts.

To achieve this WeatherLink - which operates on the MacLink system - has switched stations from the older NDA4 to the more advanced Meteosat.

This means that the weather image transmitted from outer space have been dramatically improved in quality - offering perfect clarity and true colour.

"The problem with NDA4, I was that it relied on infra red images and gave Meteosat's best of Meteosat, and that, at times, resulted in weather maps that looked cloudy and too blurry."

"The far more sophisticated Meteosat satellite totally eliminates the problem, enabling Atari owners to download pictures of a completely professional standard."

Show bargains a big draw

AM weekend survey of visitors attending the Alan Christmas Show has revealed it was a success to watch the public.

One hundred per cent indicated not only they felt their standards had been well worthwhile, but also that they plan to attend the next in the series.

The reason for the mass endorsement stemmed in the main from the vast number of special offers to be found, with a conservative estimate of total discounts available being placed in excess of £160,000.

And such was the competition between exhibitors at the show that some prices fell dramatically during the course of the event.

When the doors opened on the Friday, levels of tin discs were selling for £14.95.

By the end of the first day,

this had been slashed to £8.50.

The visitors' survey had a September*, said one major disc supplier.

That's why more than 40 per cent of visitors questioned reported that bargains were the highlight of the show.

Other major reasons given for describing the event as a success were the mix of exhibitors, the range of products, the venue and the overall presentation.

The survey also revealed the spending pattern of visitors to the show. Some 40 per cent spent up to £25, 26 per cent up to £50, a further 12 per cent up to a £100 with 22 per cent paying out more than £100.

It was fantastic*, said Alan user Donald Peterson. 'I've travelled down from Bradford for the day and I reckon I've saved not only my fare but also more than £100 in special offers.'

Olympic competition

With the winter Olympics poised to grace our television screens, Tynesoft has released Winter Olympics 88 for the Atari XL and XE.

As well as being able to take part in the simulated sporting action, which includes downhill racing, bobsleigh, slalom, ski jump and luge, the Tynesoft (081 454 4811) is running a competition with a top prize for the winter Olympics in Calgary as the star prize.

The competition, which starts on January 30, is open to all purchasers of Winter Olympics 88 and requires you to place in order the eight most important qualities which are needed by a top alpine skiing star.

Leading TV winter sports commentator David Wain contributed to a list booklet which is included with the game. Price £2.95 on cassette and £14.95 on disc.

Schematics software

A PACKAGE designed to complement word processing software has been announced by Agemem (08233 417226).

Print Manager - which requires 64k ram disc drive and a dot matrix printer - allows the user to produce flow charts, circuit dia-

grams, check magazines, short major and anything of a schematic nature.

The program also runs graphics with two and four the computer into a 40 column by 26 row window or an 80 column by 68 row document page which can be scrolled around.

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16	▼	DIZZY DICE Players	1.99
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19	●	KNOCKOUT Midas	2.99
20	●	GUN LAW Mastertronic	1.99

Compiled by Galtup/Microscope

There are four new entries this month, all in the Top Ten. While three games re-enter lower down the chart, Mastertronic's budget range is well represented with four in the Top Five - the first place with sliding them, as Decathlon from Firebird sports tomorrow.

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Ravings from a year of plenty

by
Rouloc



EVERY month I wonder if I'm going to have enough time to write this column. What with freezing kingdoms held in tension's thrall by power-seeked sorcerers, racing demons trapped in high towers and hauling me way through deep papers to bring back the last blue pearl of the Pepperg tribe, I realize I have my work cut out. And that was only yesterday!

Still, I've managed to make it in one place yet again, looking back over the year. It seems that not a day passed when I wasn't being belted, bawled, teased or lashed myself in a petty spite or dire dilemma. And the same will apply to you if you've played all the adventures that have been covered in these pages during that time. This month I'm taking the opportunity to cover my rear back over some of the adventures that stood out in 1987.

Remember Rick Hansen from *Roboco Software*? — a lovely little adventure. I don't think you saw *Special Agent Rick*, a tough guy who found nothing but spiders was set the task of slugging some heavy general from Warsaw on the world. Did Rick succeed? Well, only you can answer that if you've played the adventure. If you've not read it, I strongly recommend it to you — it's a good one.

Then along came *Hollywood Hype* from Infocom. In this you were forced to track down a number of bogus effects from your late Uncle Ruddy's Hollywood mansion. There were some really very bad scenes in *Hype* as I recall.

Did you manage to solve the multi-step puzzle of the above obfuscation? Were you successful in finding the buried scene in what must have been the biggest mess ever in an action

game? And incidentally, don't you think messes are a lot of a pain? It's about time they were dropped from adventures — so too they are just time-wasters.

And what about that beginning in *Hollywood Hype*? What a shock! I can't think of too many adventures where even getting started had the old grey matter going into overdrive. But how satisfying when at last the game dropped and you found the way to get into the machine.

Next up was *Sumatana*, an unusual text adventure in the *Electronic News* series from Broderbund courtesy of UK's Gold. Although the screen layout on this adventure was a shade unimaging, the content more than made up for it.

Then *Electronic News* gave perhaps been a bit neglected by most adventures and they recently have not been given the publicity by the contributions that the products deserve.

That is a pity because these games are very good. The power is impressive, sophisticated — on a par with Infocom's and Megawatt Scripts — and there are many innovations in the adventures. The text is lucid and the plots gripping and atmospheric.

If you've never read an *Electronic News*, I should advise no time in getting your hands on one. They are not cheap — around £25 — but they are worth every penny. Others in the series are *Burnt*, *Breakers* and *Melancholy* — they are all a joy to play.

The best adventure of the year had to be *Sutherland* from Infocom. This



Adventuring

Year	1990	1991	1992	1993
1990	1990	1991	1992	1993

featured the return of Floyd, that lovely wife robot you first encountered in *Marathon*. *Desperado* contained superb puzzles, ranging from funny local gems – the windy American ballroom *Crucial* immediately springs to mind – to getting past and upon the first ending. I've never solved

Talk about bringing tears to the eyes — well, there wasn't a handkerchief in our house that wasn't dripping. Campbell was my voice as one of the best adventures ever written.

Running a close second was the eagerly awaited Magnetic Scrolls Guild of Thieves from Harvard, the clearing follow up to The Thief.



several ways. Guild is the better of the pair: it has the same excellent period good textual descriptions and high quality graphics that The Flow has, but the story is much more tightly plotted and consistent.

The pictures are both logical and dense in the added wealth of the literature. That's a fortunate approximation at different points in the same field of

Hints & tips

Add up roughly a few of the names mentioned by unrelated sources: William Campbell (aged 12) of Glasgow for his superb map of Maryland; The Second City Not as the traditional mould of advertising. I need this advertisement for all that.

Warner Bros. would like to help with Golden Breeze the great find a camp and cannot afford the rights to the book. It is a long time since I played this one and I've lost my act. I've done them.

I think the lamp it reads the zodiac somewhere – perhaps you can find it after decomposing the lights? I seem to remember that you also have to think yourself invisible – maybe that's how you get past the light. Can anyone say for certain?

For Andrew Tonge of Leeds and other speakers still involved by The

PHOTOLOG'S RAVES

- 1 Stetsonville (Indiana)
- 2 Grand of Thomas Stamford
- 3 Jack Hays - Guide to the Galaxy, Indiana
- 4 Jewels of Goddesses Village (Hawaii) (Hawaii)
- 5 Prime Adventure (Scott Adams & Robert Adams)
- 6 Zent (Indiana)
- 7 Zent (Indiana)
- 8 The Power (Indiana)
- 9 Corbin (Indiana)
- 10 Lords of the Galaxy (Indiana)
- 11 Adventureland (Scott Adams)
- 12 Risk (Indiana)
- 13 Risk (Indiana)
- 14 Risk (Indiana)
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- 16 The Women of the Galaxy (Indiana)
- 17 Meadows of the Galaxy (Indiana)
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Thomas has won several awards already including POW Adventure Of The Year and looks like securing a steady caller for a long time to come.

To conclude our review of some of the highlights of '87 there was *Lurking Horror* (Infocom) and *Knight On Dragon* (Level 9). Both started off promisingly but turned out to be a little disappointing.

Larkin's *Warrior* had one of two things in its arsenal: a powerful, over-the-top story — it turned out to be neither more. Knight's *Q* was a more subtle, thoughtful, less "loud" book. It

first part - there are three sections in the game - one sprawling over populated and somewhat urbanizing land as both advanced fully named their place in my dedicated columns in a collection.

You'll note that many advertisers these days are for *discounters* only. That's a hard luck on those who only have *discount* skills but I'm glad that's the trend with advertisers. Savings and save every penny to get a deal drive in my business - you're saving and so is a lot of pleasure without one.

For a lot of fun I am giving you one out of the best. Many advantages I hope you will find some there that you can agree with but if not, why not write me and tell me what your own favourites are? I'll publish such lots from time to time — there's nothing like a long your own views for getting a good enjoyment.



NOT enough emphasis is placed on basic numerical skills in schools today—yearagers should know their multiplication tables and be reasonably competent at addition and subtraction.

Three entry-to-use programs can be fun and educational for kids of any age, and even adults may wish to test their knowledge of elementary math.

When the routine is first run you are asked for your name, followed by a menu screen offering different types of arithmetic problems—or you can have a random selection of each. After this you are asked for the difficulty level—1 to 10—which can be changed by pressing the Select key.

When you press the Start key 10 questions will appear one at a time and the timer is started. You are allowed three attempts at each and if the last answer you give is incorrect you will be given the correct one.

Although the test is timed, there is no time limit and your final score depends on the attempts taken at a

Let's get one of the three Rs right!

PETER WATTS fills an educational gap with a simple maths test

given question—10 marks are given for a correct answer at the first attempt, six for the second and two for the third.

At the end your score, the time taken and the fastest time displayed if you score more than 60 the level of difficulty is increased by one if you

choose the same type of problem again.

The questions are generated by random numbers—X and Y—generated in base 110 130 150 170 210 210 230 410 and 430. These are randomly modified so dividing the degree of difficulty

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PROGRAM BREAKDOWN

10-99 Title screen
100-199 Select problem and level
200-299 Completion screen and change list
300-399 Main program loop
400-499 Subroutine for addition
500-599 Subroutine for subtraction
600-699 Subroutine for multiplication
700-799 Subroutine for division
800-899 Random selection of problems
900-999 End routine
1000-1099 Can and paid page a screen
1100-1199 Pause for correct answer
1200-1299 Pause for incorrect answer

VARIABLES

Z1 Page a screen
L Level of difficulty
S Problem selected
SC Score
P Problem number
NS Number of attempts at a question
X,Y Random numbers chosen for problems
A Current answer
JF-HLP Timing variables

You win some ...

Profile: Steve Casperson
Volume 2
 Price: \$24.95 (suggested CR-66)
 Rated: C
 Company: East Star Software
 17 Federal Street, Mass.
 Weymouth MA 02155
 Tel: 617-827-1222

WHENEVER I see a compilation I am always a little dubious about the quality of the software, but with this package two of the best are good. Let's look at them individually.

If you ever play arcade games you will recognize *Scramwing Wings* as a clone of 1942. Basically you take on the role of a lone pilot and wage a bloody battle on an entire Japanese empire.

Your aircraft is a Lockheed Lightning and you take off from the carrier where you are based at the beginning of each level. If you survive you must return there to land.

By shooting certain aircraft you can gain extra

firepower or a destructor aircraft (using which is operated by the computer).

Some of the enemy aircraft take a lot of killing and the large bomber simply refuses to explode. If you get into trouble then simply loop the loop and escape the danger.

The graphics are acceptable—acceptable for the amount which are either computer- or hand-designed.

Play is quite addictive despite the nagging and the one feature that really saves the day is the smooth and efficient screen scrolling. *Scramwing Wings* is the best on the compilation and should give you hours of fun.

In *Crumbles & Salsas* you are Crumbie and work in the intergalactic zoo.

Last night while you were looking up you didn't see the little birds on the Pussycat cages properly and they have now escaped—all 36 of them.

So away you go with your

jet pack to bring them all back. There are six Pussycats to catch at the flag levels and all you have to do is go up to them and pop them into the cage.

Luckily for you they are all colorfully harmless. However, there are other entities: Ghosts, goblins and evil weasels.

If you start to get low on energy, just look for the birds and force them to replace it but be careful not to touch the walls as they are made of evil matter and make a lot of noise. If touched.

The graphics are well done and the game is fun to play so if you fancy going faster hunting this is for you.

I have read some strange introductions for games, is this post the one for *Blue Hopper* is superb. *Don't* has been awarded by the moonshiners on a strange alien world \$1,000 per week away from the interplanetary system of Bright Arrows. His only hope of survival is to find Mad Science. This involves riding the sub atomic ship across the intergalactic spatial interstices. Did you get it yet?

Your object is to advance through as many screens as you can collecting points, avoiding the aliens and the molecular disintegrator as you go.

You can be killed in one number of ways, but in the process of playing this game I couldn't keep track of what killed me or when or how it happened. Nine lives are

allotted by hopping on to a diamond shape—but only on certain screens—and then hopping off quickly.

The game has a few curious features which include chest pods—diamonds with a price around them. If you stand on one of these and press fire you will go to the next level.

Though original this game did not have much else going for it.

The concept of *The Search* is to retrieve a magic ring hidden somewhere in the frozen wastes. You have to return it to the alien castle from where you set out.

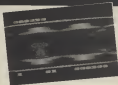
Control is by joystick and in the process of playing you will encounter different characters. When this occurs you are offered four sources of action. Play, attack, greet or hide.

There are various objects that you can find to help you in your quest. The game also has a save feature that will allow you to store your programs on tape or disc.

Yet as far as graphic adventures go this one suffers from both poor graphics and sound.

A few comparisons screen games of equal value and this is no exception. However for the price this *Four Star Compilation* does give you great money's worth.

Neil Frenkel



Audio	4
Graphics	4
Playability	4
Value for money	4
Control	2

What a great battle it was ...

Progressive Slide — Smart's
 "Just in My Hand"
 Price £19.95
 Supplier: **Slide's Gift Shop**
 20 Portland Way, Hathers
 Birmingham B6 7AG
 Tel: 091 494 4444

UNITED STATES April 1862: General Grant's dependency on the African American League army had been relatively successful. But then came that fateful day when he and his 65,000 strong force was caught in a surprise attack by Confederate General Johnston and his army of 100,000 men.

So began the Battle of Salish — two days that were to prove Grant's first real test as Gen.

In the latest writings from experts Strategic Simulations you have the chance to determine the outcome of the battle.

Figure 1. The effect of the concentration of the solution on the adsorption of the dye. The concentration of the solution was 0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08, 0.09, 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 15.0, 20.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0, 100.0, 150.0, 200.0, 300.0, 400.0, 500.0, 600.0, 700.0, 800.0, 900.0, 1000.0, 1500.0, 2000.0, 3000.0, 4000.0, 5000.0, 6000.0, 7000.0, 8000.0, 9000.0, 10000.0, 15000.0, 20000.0, 30000.0, 40000.0, 50000.0, 60000.0, 70000.0, 80000.0, 90000.0, 100000.0, 150000.0, 200000.0, 300000.0, 400000.0, 500000.0, 600000.0, 700000.0, 800000.0, 900000.0, 1000000.0, 1500000.0, 2000000.0, 3000000.0, 4000000.0, 5000000.0, 6000000.0, 7000000.0, 8000000.0, 9000000.0, 10000000.0, 15000000.0, 20000000.0, 30000000.0, 40000000.0, 50000000.0, 60000000.0, 70000000.0, 80000000.0, 90000000.0, 100000000.0, 150000000.0, 200000000.0, 300000000.0, 400000000.0, 500000000.0, 600000000.0, 700000000.0, 800000000.0, 900000000.0, 1000000000.0, 1500000000.0, 2000000000.0, 3000000000.0, 4000000000.0, 5000000000.0, 6000000000.0, 7000000000.0, 8000000000.0, 9000000000.0, 10000000000.0, 15000000000.0, 20000000000.0, 30000000000.0, 40000000000.0, 50000000000.0, 60000000000.0, 70000000000.0, 80000000000.0, 90000000000.0, 100000000000.0, 150000000000.0, 200000000000.0, 300000000000.0, 400000000000.0, 500000000000.0, 600000000000.0, 700000000000.0, 800000000000.0, 900000000000.0, 1000000000000.0, 1500000000000.0, 2000000000000.0, 3000000000000.0, 4000000000000.0, 5000000000000.0, 6000000000000.0, 7000000000000.0, 8000000000000.0, 9000000000000.0, 10000000000000.0, 15000000000000.0, 20000000000000.0, 30000000000000.0, 40000000000000.0, 50000000000000.0, 60000000000000.0, 70000000000000.0, 80000000000000.0, 90000000000000.0, 100000000000000.0, 150000000000000.0, 200000000000000.0, 300000000000000.0, 400000000000000.0, 500000000000000.0, 600000000000000.0, 700000000000000.0, 800000000000000.0, 900000000000000.0, 1000000000000000.0, 1500000000000000.0, 2000000000000000.0, 3000000000000000.0, 4000000000000000.0, 5000000000000000.0, 6000000000000000.0, 7000000000000000.0, 8000000000000000.0, 9000000000000000.0, 10000000000000000.0, 15000000000000000.0, 20000000000000000.0, 30000000000000000.0, 40000000000000000.0, 50000000000000000.0, 60000000000000000.0, 70000000000000000.0, 80000000000000000.0, 90000000000000000.0, 100000000000000000.0, 150000000000000000.0, 200000000000000000.0, 300000000000000000.0, 400000000000000000.0, 500000000000000000.0, 600000000000000000.0, 700000000000000000.0, 800000000000000000.0, 900000000000000000.0, 1000000000000000000.0, 1500000000000000000.0, 2000000000000000000.0, 3000000000000000000.0, 4000000000000000000.0, 5000000000000000000.0, 6000000000000000000.0, 7000000000000000000.0, 8000000000000000000.0, 9000000000000000000.0, 10000000000000000000.0, 15000000000000000000.0, 20000000000000000000.0, 30000000000000000000.0, 40000000000000000000.0, 50000000000000000000.0, 60000000000000000000.0, 70000000000000000000.0, 80000000000000000000.0, 90000000000000000000.0, 100000000000000000000.0, 150000000000000000000.0, 200000000000000000000.0, 300000000000000000000.0, 400000000000000000000.0, 500000000000000000000.0, 600000000000000000000.0, 700000000000000000000.0, 800000000000000000000.0, 900000000000000000000.0, 1000000000000000000000.0, 1500000000000000000000.0, 2000000000000000000000.0, 3000000000000000000000.0, 4000000000000000000000.0, 5000000000000000000000.0, 6000000000000000000000.0, 7000000000000000000000.0, 8000000000000000000000.0, 9000000000000000000000.0, 10000000000000000000000.0, 15000000000000000000000.0, 20000000000000000000000.0, 30000000000000000000000.0, 40000000000000000000000.0, 50000000000000000000000.0, 60000000000000000000000.0, 70000000000000000000000.0, 80000000000000000000000.0, 90000000000000000000000.0, 100000000000000000000000.0, 150000000000000000000000.0, 200000000000000000000000.0, 300000000000000000000000.0, 400000000000000000000000.0, 500000000000000000000000.0, 600000000000000000000000.0, 700000000000000000000000.0, 800000000000000000000000.0, 900000000000000000000000.0, 10000000

Tapping your multitasking skills will let you meet the challenge of a turn-of-moment you have the choice of playing at any of three levels: 180 columns, 104 medals or an unlimited.

There are 75 girls in each grade, each represented by 30 in total of each row. A bar is now being set a change of phase, which are placed on over a swinging 30 x 30 square colored walling in each of the double rows.

The main glades light and airy, woods clearings roads & close clarks (many always behind stream) - last river a better road and Shish Creek.

These stages can be observed across a wide range — growing a diamond, stage of the whole cell, and so on — as you move from the first to the last.

...and a large number of...

There are four types of soft-shell infant carriers put to use, and military lists of these are used to compare — including quality ratings — efficiency, female foreign design, type, construction and sales last year. The units are for infants and are supported by specific design, construction

Major international and advanced lighting products in order of price, starting from bottom and going upwards, are: low bay, ceiling, track, and high bay. The products are followed by two sets of Can fixtures and track lighting, and then by two sets of pendant and chandelier products. The last set is a variety of decorative pieces.

Q: How much time does it take to get a new car?

Black phone offers a wide variety of options and the game is extremely flexible in play. It is not possible in a short review to do justice to the range of options for amateurs and commands available and to the depth and complexity – and hence value – of the game.

Well, paid to give you a full view of the conditions, but not in a way of the options open to you. You are asked to have contact with leaders from whom only becoming visible when moved adjacent to giving an operation phase. This is particularly recommended if you want to relationship primary the face, and some.

Within any of the three overall complexity levels, you may pick from any of five difficulty levels. Level three is the most complex and contains no modification by other factors.

The other levels affect the cancellations. Inflected in percent - one and two favour the Confederates, player four and five the winners.

Antennae supply the afferents of the vomer and

and travel at times as a
convenient mode, he says
and also has a direct
passage to one of the
best, the longest and

It might be said that this is a matter of degree, and that even the smallest law is a degree of the same or almost the same thing. But, I think that this is not so. There are some laws that are not degrees of the same or almost the same thing. There are some laws that are not degrees of the same or almost the same thing. There are some laws that are not degrees of the same or almost the same thing.

The game is designed for both old and young kids. For example, older boys have a "Gothic" setting, like a medieval castle, and have to make that game scary and fast and/or competitive, or conflict, and this is specific to the code.

Fortunately, the entire operating documentation is in the form of a glossy 88-page book that clearly sets out the instructions, background, complexities and overall picture.

The game is supplied in an attractively illustrated box and comes complete with a staff map of the battlefield at the moment at which it is a handy reference volume.

Shogi is sure to be greeted with delight by all youngsters, for it is flexible enough for beginners to play at a fairly basic level but true sophistication and challenge really become apparent at the higher levels.

Then we can find you just
how to begin and get a real
dependable business system
for nothing. A copy for all
of us, please.

References



Category	2000	2001	2002	2003
Expenditure on R&D	1.00	1.00	1.00	1.00
Expenditure on R&D	1.00	1.00	1.00	1.00
Expenditure on R&D	1.00	1.00	1.00	1.00
Expenditure on R&D	1.00	1.00	1.00	1.00
Expenditure on R&D	1.00	1.00	1.00	1.00

Star rating

Developer: Brian Kopp
Editor: GUS JOHNSON (Star)

Developer: Firebird Animation
Editor: Peter D. Appleton
Price and value: \$69.95 (V)
Ref: 251-434-4474

ALERT! Alert Delta Base to Star Gate - Priority One path - Coals Red Code Red. This begins *Mine Police* - one of the best games to appear for a long time.

Your mission is to fly Star Quest, your super star fighter, over the gigantic alien metropolis, destroying as much of the most sophisticated as possible.

Your goal is to annihilate the ship's main reactor. This sounds straightforward, but isn't it a little more?

As you attempt to destroy the metropolis you are constantly harassed by the defense fighters. These small craft attempt to distract you with monotonous

distraction fire, often if they miss, miss their entry and miss you.

As well as avoiding the fighters you must negotiate tall pillars, rising rigs and shadowed objects. This addition makes the game extremely tough.

The nice grid outlines one of the features of why smooth is directional scrolling, but to the common mortal this means that the screen scrolls from left to right in a fashion very similar to *Defender*.

The graphics are superb; the colours especially used and together they make a stunning display. Intricate design work adds to the overall quality and style and a nice feature is that every time you lose a life the colours change.

The sound effects are adequate but are liked above the savings by the digitised speech. On landing you are greeted with the message: 'The battle begins'.



The credit for the quality of sound goes to D. M. Systems. Display graphics have also improved in the June 1987 issue of *Star Quest*.

Music speech can be heard as you play, and it is very easy to read and clear of all opening messages.

The game has a nice player mode and looks very slick plugged in, perhaps its response is very slow and this is obviously because at times you have to turn slightly to avoid the buildings as defence work.

Because of fast music introduction as you lose lives, you feel in deep trouble.

Mine Police is well packaged and the play and control score very high.

Verdict: The sound is superb and superb sound is an important factor. *Mine Police* is that at times it is very hard to feel it is difficult in telling what direction.

Even though the game play is difficult it is really fun. It is the ultimate 'shoot things with names' game, featuring the very best of the Alien's graphic capabilities - I can only score.

Neil Forsyth

Sound	—	9
Graphics	—	10
Playability	—	10
Value for money	—	9
Overall	—	9

Blasting can be boring

Developer: Minsky One Star

Price: £10.95
Developer: Softbyte, Minsky
Editor: Jonathan Hunt
Price and value: \$14.95 (V)
Ref: 251-434-4474

RUSTY is a rather young droid whose main objective was to get old, and he is more than a bit sceptical. You are Rusty's best explorer.

But one day he got separated from his companions, so he went for a look around. When he came he found a topographical converter and promptly discovered the main computer wasn't all that surprised.

Oh well, another day, another droid. It muttered

and logged Rusty down in his memory banks as 'Foolish droid terminated'. Well, it saved a lot of time and was far easier than having a report detailing Rusty's sudden disappearance.

But Rusty wasn't dead. In fact he was very much alive, but in a void where except for sound effects, which only repeat what has either happened or has only chance was to run.

What little he knew about dimensional converters - which certainly wasn't much - told him that in a construct universe such as this, if he kept fighting and moving, it should stress the fabric of the universe.

In theory this should ensure that he would be thrown back into the real

world. But how, long will that last? Only you can decide.

The action starts moving up for what basically is a strange kind of shoot 'em up. You control a small droid in the centre of the screen, first having to shoot anything that moves.

The enemies that shoot you in an attempt to collide with you, therefore destroy your power.

To increase your life energy you have to make contact with the floating heart logos. These help, but not much and you have to collect a lot to make any gain at all.

The real action you encounter comes in various forms and colours - you need to destroy them all to progress to the next level.

Finally, integrating a couple of things into it.

RUSTY is a weird kind of game, and it does get a little boring after awhile. Though original, it soon becomes annoying rather than amusing.

Despite there's not really much there, it's been a lot of fun, especially in a game and time is made simple by holding down the fire button and dragging the joystick in that direction.

The playing and game play are both very good.

Robert Owen

Sound	—	8
Graphics	—	8
Playability	—	8
Value for money	—	8
Overall	—	8

Good, but not great

Program: *Four Great Games*
Price: £200 (boxed set)
Developer: Tymeworks, distributed
 by Computer Vision, available
 soon from Tynes, Time and
 View, N021 420
Telephone: 091-458-4601

FOUR Great Games is the latest budget compilation from Tymeworks. I wouldn't necessarily agree that the collection qualifies for the word "Great".

The four included are a pretty mixed bunch – but there should be something on offer here to entertain or amuse a good many.

Mousetrap is a second-screen platform game. You must guide Marvin the ravenous mouse through 22 screens to sniff out his favourite edible cheese.

Naturally it isn't going to be made easy for you and all sorts of hazards and obstacles must be overcome including dragons, flying fire eggs, toxic rats and Christmas puddings.

In each screen you must collect what appears to be boxes in order to gain access to the next one. The final one holds the grand wedge of golden cheese.

Wise and cheese don't always departure from the more usual registers and games, but **Mousetrap** is hardly original.

Despite being described in the packaging blurb as an accessible graphics demonstration, the graphics are only average and the sound – a continuous wailing, the constant tune – a poor fit to the otherwise playable and pretty busy box.

Space Hawk is a well put together vertically scrolling space shoot 'em up. There's not much plot, just pure unadorned mass murder.

Flying the gunship Delta you have to earn your stripes by exploring the planets in the neighbouring Solar System.

The Star Council has given you licence to kill any hostile alien, should you

encounter them, and destroy their defences.

Naturally you come across millions of the little drills and of course they are all hostile – well I certainly never met a friendly one.

You have the ability to fly both up and down, and can also adjust your speed – which can make for some pretty tricky manoeuvring. Despite the accessibility of the Solar System exploration the intensity means that you must shoot anything that moves and just about anything that doesn't. Captain Ark would not have approved I'm sure.

You start with a shield strength of 26 points which is gradually eroded by collisions with the hundreds of enemy space ships, each hit knocking off one point. To get to the next level the grounded space fleet must be destroyed, together with a substantial proportion of ground installations. The graphics are up to standard and the sound adequate, if not exactly stunning, making **Space Hawk** a good and pleasing game.

I played **Wish Upon Wars**. It isn't new and playing it again now, my opinion of it hasn't changed. Armed with a rifle and a dozen hand grenades you have to single-handedly defeat the enemy.

Working your way through a rather dismal landscape you must dodge bullets, trap trees, ponds and bullets on your way to the first enemy tank.

If you fail all its defences you will gain access to the next level for a bit more of the same.

An extra life is awarded for each 10 000 points scored, but **Wish Upon Wars** doesn't build up interest long enough to get that far. The pace is rather too slow, graphics poor and sound irritating in the extreme.

Killer Cycle is altogether different. The visual presentation is simplistic to see the best and the plot absolutely



minimal – put this aside for one or two players with optional computer controlled opposition making the numbers up to four.

Pressing **Start** clears the screen and four coloured lines appear each moving at a steady pace. The computer controlled units move by their own volition and you control the direction and speed of your own, leaving a solid coloured trail in your wake.

Neither you nor your opponents can move across any trail and the objective is to keep moving without creating – hitting a trail makes instant oblivion.

With four players this soon becomes pretty tricky and careful coordination is necessary to keep going in the tightest corners.

Players who crash disappear from the screen, together with their trail, making more space available to the survivors. The

last survivor is awarded maximum points and the others get points on a decreasing scale.

This game continues until a pre-set total is reached.

There are seven different screen layouts, rotated in turn with at least the first having blocks or small areas to make the even more difficult.

Although it is a simple game in concept and presentation I found it a surprisingly enjoyable, competitive and addictive – although quite where oblivion came into it I don't know.

At the price *Four Great Games* it has to be good value for money.

Nick Reynolds

Game	5
Graphics	2
Playability	2
Value for Money	5
Overall	3



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Back to the future

I BOUGHT my first cartridge game system a long time ago — an Atari VCS. At this time the company was relatively unknown in Britain, but the VCS was nevertheless a huge success. Soon after came the Atari home computer and that was where the games age really started.

Atari produced some superb software to complement its new computers. Most numbers of games appeared in the form of new cartridges and their popularity was second to none: dozens their cost a hefty £30 or so. Then suddenly the cartridge-based games lost their appeal, mainly because of the advent of discs which were cheaper and easier to produce.

As the computers changed in quality and size of memory, so the software had to change too. Why settle for a good 100 cartridge game when you could write a superb £30 game disc and produce it more cheaply?

Atari's first major success was in the field of arcade games, which

NEIL FAWCETT looks at software that has stood the test of time

means that many of the early cartridge-based packs were Atari Out-of-print conversions.

The best of these have become legendary and entertained millions of Atari users world-wide. Not all the conversions met with acclaim, but the success stories far outnumber the failures.

Now, with the release of the new XL Games Console, Atari is attempting to bring the cartridges back into the limelight — at an attractive price.

This means that people new to the world of Atari will get a chance to play the classics that made these computers popular in the old days — and kept them up until late in the evening. So let's take a look at some of the old favourites that may again become blockbusters.

DEFENDER

Atari's third 'Invader' war home game and you have to fly around destroying them and rescuing the stranded humans before the aliens destroy them.

The object of the game is simple. Fly around at your super sonic speed fighter, blasting the alien, with your laser cannon or old-fashioned life energy screen with your smart bombs. The alien starts from left to right very

slowly. Most home versions offer versions of this game, but none is as spectacular as the Atari one.

Stunning graphics, fabulous sound effects and a powerful speed make this one a winner.

GALAXIAN

The ultimate sequel to the early Space Invader's shoot 'em up. Galaxian first appeared in arcades in 1979 and met with overwhelming success.

The Atari conversion retained all the characteristics, qualities and charm of the original, and superb graphics and animation enhanced the playability.

Even after years of playing the game it's still a pleasure to watch waves after waves of alien monsters methodically falling down the screen, in an attempt to destroy you. Even if you don't rate shoot 'em ups, it's impossible not to like this one.

CENTPEDE

In 1981 Atari Co. introduced this bug-bait game in arcades. It was later converted for the Atari 8-bit range and was very popular indeed.

You are in a game with a bug gallop, and you have to kill the centipedes as they march back the screen. But you are hindered by the



PACMAN

If you haven't played Pacman you haven't lived — it's the ultimate in maze games and the inspiration of countless clones.

When released in the winter of 1980, total package an official Pacman to play! I had many a late night screaming round the maze eating the pellets and attempting to avoid the hungry ghosts. But when I ate the power pill, it was my turn to do the eating!

JOUST

In this novel arcade conversion you are mounted on a giant bird. You have a jousting lance — hence the title — and you must joust with other knights who are constantly rotated.

You are treated to stunning graphics and sound. The noise and animal roar of the birds are beautifully done and the playing is old constantly changes.

Playing the computer is fun, but the game comes into its own when you have a live opponent.



DIG-DUG

This is one of the most popular games I ever played on the Atari — and the most popular, but certainly the most enjoyable. On profile you can see an invertebrate from the conveyor belt kept all the funnier.

The game play is simple — you have to dig your way through the earth. Appearing on screen are bones, vegetables, and if you eat them before they disappear, you can

score up to 5,000 points. Living in small caves are monsters like Pokeys, the intelligent enemies that can kill you with a single touch.

You can kill the monsters by chopping hammers on their heads or by planting the fire button quickly to inflict them until they explode — a little bit gruesome, perhaps — but different.

All in all this is a very amusing game and great for the kids.



feed that part of the time they are obstructed by mushrooms. You can also move your bug away up and down the screen as well as left to right — this was a new concept in shoot 'em up when the game was released.

This version from I gave got the style of the arcade original but it is certainly entertaining and challenging.

QIX

Here is one of the simplest games you could ever play and one of the most addictive. All you have to do is collect in 75 per cent of the screen — simple.

However, you are hindered as you do this by a Qix that bounces around the screen in a haphazard fashion, and by the two Spies that travel along the lines you draw. If these or the Qix touch you, you lose a life.

STAR RAIDERS

When I first bought a 15k Atari 400 I got a joystick and this game. This has never been a challenge quite like it and never one that fits quite as snugly into an Atari console.

You take the role of a starship commander who has the simple task



of saving the universe from total destruction — and all before breakfast.

The game is joystick controlled but you also have a range of single-key commands.

Several years and numerous pay sticks have not even dented my joy for this one. Many games have attempted to match it but none have succeeded.

MISSILE COMMAND

In this game — one of the most challenging I have ever played — you need lightning reflexes as you attempt to save the world from destruction by incoming nuclear missiles.

As yet another arcade conversion, the only difference from the original is that you control one missile bank instead of three and use a joystick instead of a track ball. Later versions allow you to use Atari Test ball by pressing Command +1 to get you into the right mode.

It is a game that every Atari owner should have and the new XE has some come with it built in.

It has been said that the early software of Atari computers can be attributed to this game — after all, a computer is only as good as the software written for it.

DONKEY KONG

This is one of the best and, for me, one of the best platform games ever to be converted to a home video.

You play the part of Mario, the maintenance man, and you have to rescue your girlfriend from the gorilla girl, Donkey Kong. This is made all the more fun by the fact that you are also a starship commander who has the simple task

of saving the universe from total destruction — and all before breakfast.

Due to the tremendous success of this game, a follow-up — Donkey Kong Jr. — was released and this also appeared on early discs. In this version you play the son of Donkey Kong and you are out to rescue your dad who has been kidnapped by Mario. The game play is not too different from the first. These are two very classic games.



ONLINE COMPUTERS ARE HELPING UK FARMERS

A NEW users group has been set up on MicroLink to help UK farmers make better use of their computers. The British Farm Computer Users' Group is being organised by Andrew Cooley, who is project co-ordinator for an farm systems with the Milk Marketing Board.

'My experience is that many farmers are already exploring the potential of money beyond their use in day to day management', he said, 'but they suffer, perhaps more than managers in any other business, from the isolation inherent in farming itself. The pri-

mary aim of BFUCG is to overcome this isolation.

We want farm computer users to be able to share their data and experience and get the maximum value from their increasingly powerful management tools.

An first MicroLink is providing a learning session on its bulletin board, but eventually BFUCG will become a closed user group on the system.

Support for the new

organisation has come from Dr John Cooley, head of the Milk Marketing Board's farm management system, and from leading farm software suppliers Farmplan and Sun-It.

Special terms are being arranged for farmers subscribing to MicroLink, and BFUCG - and a reduced subscription will also apply for existing MicroLink users who join BFUCG before the end of this year.

Moving with the times

ONE of Britain's largest remotely operated has joined MicroLink in order to improve customer service between its wide spread offices.

Scopus is a subsidiary of R&D International Removets - shops by land, sea and air to just about anywhere in the world you can think of, everything from a simple loan to a haulage of furnishings.

The company has 15 depots in the British Isles plus branches in Australia, New Zealand, Canada, South Africa and the Middle East.

All are now able to send messages to each other via MicroLink and electronic mail services.

Scopus has installed at least one micro and modem at each of its depots, and has eight main systems in its Glasgow headquarters.

It will add up to some very busy MicroLink networks - last year Scopus handled more than 20,000 individual shipments weighing a total of 21 million lbs.

Comms boom in the heavens

AMATEUR astronomers are joining MicroLink at the rate of ten a month.

The reason is that nothing beats electronic mail as a means of getting to know about the latest happenings in the heavens.

Initiative behind the booming interest in MicroLink comes from Guy Hurst, editor of The Astronomer, a monthly magazine with an international readership.

A constant stream of actual activity means he also needs to produce twice-weekly newsletters detailing all the fresh sightings reported by the devotees to our Institute in America. 'When it is processed and distributed by conventional means, the information is often quite dated by the time it reaches our readers', said Guy Hurst.

MicroLink has, however,

speeded up the transmission of news from America. A paging device alerts the user to a brief message coming from the British section and I don't waste a moment mulling it via Email.

'Those of our members with MicroLink facilities can often access information the same day it reaches me - but others have to wait until one of my newsletters arrives by post. That's why so many astronomers are keen to join MicroLink.

People in places as far away as Sweden, West Germany, Australia and New Zealand are now receiving the brief version of my newsletters. This means they are often able to study new phenomena within hours of a first sighting - something not possible before we joined MicroLink.

The fax in a flash

SHROPSHIRE entrepreneur Duncan Baker has come up with a novel idea for getting more mileage out of his MicroLink subscription.

He is using the system to help him operate a haulage service from his office in Lydbury.

'Basically we need the fax machine for our own purposes', said Duncan, proprietor of the Lydbury English Centre, 'but we have a fair amount of spare capacity.

'Seeking to help cover our costs we've started a fax service priced at roughly half that of other local agencies.

The service Duncan offers includes receiving text via MicroLink electronic mail or telex; printing it out on plain paper or letterhead and distributing it by fax. And of course the procedure also operates in reverse when required.

DICER

ANYONE who has played Yahtzee will know just how addictive it is. In this computerized version of the original dice game, points are gained by rolling five dice and having those that score the most useful.

After a total of three full throws — irrespective of the number of dice held — you choose the category that you want to enter the dice combination into. The available categories are shown on Figure 1 and your final score is displayed once all three are all filled.

If the dice fall well after the first or second throw of a turn, just hold them all and select Three again. After each set of three throws your score must be entered into a category — even if it means you get no points.

This program has been written with liberty in mind and is fully controlled by the joystick using Fire to select or deselect dice held or to choose the category. Various prompts indicate what to do, and the program saves itself.

Even if you have never played the game before you will soon get the idea — and that first problem-solving counted away from it. The challenge is simple. Score the maximum 348. With skill and luck it is possible.



STEVE KNIGHT introduces an intriguing and sometimes infuriating game



VARIABLES

- SCORE** Holds the scores of the five dice used. The sixth position corresponds to the roll option.
- CATS** Corresponds to the seven categories of the random categories.
- OPTION** Used initially to decide whether a dice has been held. Used again to show the quantity of the substance of each number on the dice.
- HIGH** High score.
- SC** Current score.
- FOLLOWER TOTAL** Is numbers.

PROGRAM BREAKDOWN

- 80-885** Initializes variables and draws the screen.
- 885-950** Main loop.
- 1000-1100** Dice rolling and selection routine.
- 1200-1370** Further routine to roll and display dice.
- 1400-1500** Decide which category to print.
- 2000-2050** Displays selected category and total score.

Combination	Description	Score	Max
One	Any number of ones	Total of ones	5
Two	Any number of twos	Total of twos	10
Three	Any number of threes	Total of threes	15
Four	Any number of fours	Total of fours	20
Five	Any number of fives	Total of fives	25
Six	Any number of sixes	Total of sixes	30
High score	Any five dice	Total of all dice	35
Full house	Two dice the same other than the same	35	50
Four	Two dice the same	highest pair	12
3 of a kind	Three dice the same	Best three	18
4 of a kind	Four dice the same	Best four	24
5 of a kind	Five dice the same	Best five	30
2 Pairs	Two dice the same and two others the same	Total of two pairs	24
Run of three	Three consecutive dice	Total of dice in run	15
Run of four	Four consecutive dice	Total of dice in run	18
Run of five	Five consecutive dice	Total of dice in run	20
		Total	348

Figure 1 Variable categories

Turn to Page 22

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2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2433	2434	2435	2436	2437	2438	2439	2440	2441	2442	2443	2444	2445	2446	2447	2448	2449	2450	2451	2452	2453	2454	2455	2456	2457	2458	2459	2460	2461	2462	2463	2464	2465	2466	2467	2468	2469	2470	2471	2472	2473	2474	2475	2476	2477	2478	2479	2480	2481	2482	2483	2484	2485	2486	2487	2488	2489	2490	2491	2492	2493	2494	2495	2496	2497	2498	2499	2500	2501	2502	2503	2504	2505	2506	2507	2508	2509	2510	2511	2512	2513	2514	2515	2516	2517	2518	2519	2520	2521	2522	2523	2524	2525	2526	2527	2528	2529	2530	2531	2532	2533	2534	2535	2536	2537	2538	2539	2540	2541	2542	2543	2544	2545	2546	2547	2548	2549	2550	2551	2552	2553	2554	2555	2556	2557	2558	2559	2560	2561	2562	2563	2564	2565	2566	2567	2568	2569	2570	2571	2572	2573	2574	2575	2576	2577	2578	2579	2580	2581	2582	2583	2584	2585	2586	2587	2588	2589	2590	2591	2592	2593	2594	2595	2596	2597	2598	2599	2600	2601	2602	2603	2604	2605	2606	2607	2608	2609	2610	2611	2612	2613	2614	2615	2616	2617	2618	2619	2620	2621	2622	2623	2624	2625	2626	2627	2628	2629	2630	2631	2632	2633	2634	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646	2647	2648	2649	2650	2651	2652	2653	2654	2655	2656	2657	2658	2659	2660	2661	2662	2663	2664	2665	2666	2667	2668	2669	2670	2671	2672	2673	2674	2675	2676	2677	2678	2679	2680	2681	2682	2683	2684	2685	2686	2687	2688	2689	2690	2691	2692	2693	2694	2695	2696	2697	2698	2699	2700	2701	2702	2703	2704	2705	2706	2707	2708	2709	2710	2711	2712	2713	2714	2715	2716	2717	2718	2719	2720	2721	2722	2723	2724	2725	2726	2727	2728	2729	2730	2731	2732	2733	2734	2735	2736	2737	2738	2739	2740	2741	2742	2743	2744	2745	2746	2747	2748	2749	2750	2751	2752	2753	2754	2755	2756	2757	2758	2759	2760	2761	2762	2763	2764	2765	2766	2767	2768	2769	2770	2771	2772	2773	2774	2775	2776	2777	2778	2779	2780	2781	2782	2783	2784	2785	2786	2787	2788	2789	2790	2791	2792	2793	2794	2795	2796	2797	2798	2799	2800	2801	2802	2803	2804	2805	2806	2807	2808	2809	2810	2811	2812	2813	2814	2815	2816	2817	2818	2819	2820	2821	2822	2823	2824	2825	2826	2827	2828	2829	2830	2831	2832	2833	2834	2835	2836	2837	2838	2839	2840	2841	2842	2843	2844	2845	2846	2847	2848	2849	2850	2851	2852	2853	2854	2855	2856	2857	2858	2859	2860	2861	2862	2863	2864	2865	2866	2867	2868	2869	2870	2871	2872	2873	2874	2875	2876	2877	2878	2879	2880	2881	2882	2883	2884	2885	2886	2887	2888	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2899	2900	2901	2902	2903	2904	2905	2906	2907	2908	2909	2910	2911	2912	2913	2914	2915	2916	2917	2918	2919	2920	2921	2922	2923	2924	2925	2926	2927	2928	2929	2930	2931	2932	2933	2934	2935	2936	2937	2938	2939	2940	2941	2942	2943	2944	2945	2946	2947	2948	2949	2950	2951	2952	2953	2954	2955	2956	2957	2958	2959	2960	2961	2962	2963	2964	2965	2966	2967	2968	2969	2970	2971	2972	2973	2974	2975	2976	2977	2978	2979	2980	2981	2982	2983	2984	2985	2986	2987	2988	2989	2990	2991	2992	2993	2994	2995	2996	2997	2998	2999	3000
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All software consists of genuine, brand new, original files. Prices include post & packing (Orders of less than £5 in total please add 50p) Europe add £1 for 1st item then 50p for each additional item. Subject to availability, all software is usually despatched within 24 Hrs. Please make Cheques/P.O.s payable to 'COMPUTERWARE'.



Add-a-Mouse

SIMON MILLER
has a handy line
in joystick-driven
cursor routines

MOST programs require input from you at some stage, even if it's only to select a game level, or supply a year/no answer. Complete software often has a wide range of options to choose from, and in these programs, cursor or mouse-controlled means offers significant advantages over standard keyboard input.

The mouse moves a cursor around the screen without affecting anything that's already printed there—usually a menu of available options. You position the cursor over the option you want, then press a button to select it—there's no keyboard entry whatsoever as you can't accidentally type something which will crash the program.

A mouse can be used where keyboard input is difficult—for example on graphs or screens without text windows—so many people will find it much less daunting than an array of keys.

The ST series all contain an operating system which is specifically designed for mouse control. No such luck with the 8-bit range, unfortunately, but it is possible to emulate many mouse functions using an ordinary joystick. An example program, *Paint*, employs this technique to select colours and features.

The routine described here will move a player's mouse cursor under joystick control quickly and accurately about the screen in any Graphics mode, even while a Basic program is running. The cursor's horizontal and vertical coordinates are returned in two addresses at the top of page 8, so there's no problem keeping track of position, and you can define a window anywhere on screen to confine it.

The cursor can flash at a rate of your choice, or remain unblinking, and it's easy to switch the active mouse system on or off at different points in your Basic program.

You could also use this routine to make letter matching, word finding, counting or other educational games

for small children who cannot yet read or write.

It's also valuable for applications involving the general public, such as food ordering, awards or shop demonstrations, where the computer console can be locked well away from merrymaking fingers.

Program 1 contains the main routine. It's mainly machine code, so take your care typing the data statements, and be sure to store a safety buffer to run it for the first time.

Lines 10 reserve eight pages above system memory to hold all the data. The first four act as a buffer to protect the machine code from those commands which erase data above RAMTOP. Clear screen and Graphics commands will erase the first 64 bytes

in the reserved area, while clearing a text window will write a total of 320 bytes. If there's a 10 risk from these commands in your Basic program, you can change the second statement in line 10 to POKE 128,0 and then save you 16 of memory.

The next four pages hold the player's mouse data but, as always, the first 32K bytes are not used for player or mouse data, so we can store all the machine code there.

The routine wedges itself into the vertical blank interval and is therefore executed approximately every fifth of a second. This means that the routine does not steal any of Basic's processing time, so program speed is not affected and the program will run happily no matter what Basic is doing.

1. BASIC SOURCE ROUTINE

```

1000 POKE 128,0:POKE 129,0
1010 POKE 130,0:POKE 131,0
1020 POKE 132,0:POKE 133,0
1030 POKE 134,0:POKE 135,0
1040 POKE 136,0:POKE 137,0
1050 POKE 138,0:POKE 139,0
1060 POKE 140,0:POKE 141,0
1070 POKE 142,0:POKE 143,0
1080 POKE 144,0:POKE 145,0
1090 POKE 146,0:POKE 147,0
1100 POKE 148,0:POKE 149,0
1110 POKE 150,0:POKE 151,0
1120 POKE 152,0:POKE 153,0
1130 POKE 154,0:POKE 155,0
1140 POKE 156,0:POKE 157,0
1150 POKE 158,0:POKE 159,0
1160 POKE 160,0:POKE 161,0
1170 POKE 162,0:POKE 163,0
1180 POKE 164,0:POKE 165,0
1190 POKE 166,0:POKE 167,0
1200 POKE 168,0:POKE 169,0
1210 POKE 170,0:POKE 171,0
1220 POKE 172,0:POKE 173,0
1230 POKE 174,0:POKE 175,0
1240 POKE 176,0:POKE 177,0
1250 POKE 178,0:POKE 179,0
1260 POKE 180,0:POKE 181,0
1270 POKE 182,0:POKE 183,0
1280 POKE 184,0:POKE 185,0
1290 POKE 186,0:POKE 187,0
1300 POKE 188,0:POKE 189,0
1310 POKE 190,0:POKE 191,0
1320 POKE 192,0:POKE 193,0
1330 POKE 194,0:POKE 195,0
1340 POKE 196,0:POKE 197,0
1350 POKE 198,0:POKE 199,0
1360 POKE 200,0:POKE 201,0
1370 POKE 202,0:POKE 203,0
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1460 POKE 220,0:POKE 221,0
1470 POKE 222,0:POKE 223,0
1480 POKE 224,0:POKE 225,0
1490 POKE 226,0:POKE 227,0
1500 POKE 228,0:POKE 229,0
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1600 POKE 248,0:POKE 249,0
1610 POKE 250,0:POKE 251,0
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2110 POKE 350,0:POKE 351,0
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2130 POKE 354,0:POKE 355,0
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3020 POKE 532,0:POKE 533,0
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3040 POKE 536,0:POKE 537,0
3050 POKE 538,0:POKE 539,0
3060 POKE 540,0:POKE 541,0
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3150 POKE 558,0:POKE 559,0
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3170 POKE 562,0:POKE 563,0
3180 POKE 564,0:POKE 565,0
3190 POKE 566,0:POKE 567,0
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3260 POKE 580,0:POKE 581,0
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3280 POKE 584,0:POKE 585,0
3290 POKE 586,0:POKE 587,0
3300 POKE 588,0:POKE 589,0
3310 POKE 590,0:POKE 591,0
3320 POKE 592,0:POKE 593,0
3330 POKE 594,0:POKE 595,0
3340 POKE 596,0:POKE 597,0
3350 POKE 598,0:POKE 599,0
3360 POKE 600,0:POKE 601,0
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3380 POKE 604,0:POKE 605,0
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3410 POKE 610,0:POKE 611,0
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3560 POKE 640,0:POKE 641,0
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3580 POKE 644,0:POKE 645,0
3590 POKE 646,0:POKE 647,0
3600 POKE 648,0:POKE 649,0
3610 POKE 650,0:POKE 651,0
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3630 POKE 654,0:POKE 655,0
3640 POKE 656,0:POKE 657,0
3650 POKE 658,0:POKE 659,0
3660 POKE 660,0:POKE 661,0
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3710 POKE 670,0:POKE 671,0
3720 POKE 672,0:POKE 673,0
3730 POKE 674,0:POKE 675,0
3740 POKE 676,0:POKE 677,0
3750 POKE 678,0:POKE 679,0
3760 POKE 680,0:POKE 681,0
3770 POKE 682,0:POKE 683,0
3780 POKE 684,0:POKE 685,0
3790 POKE 686,0:POKE 687,0
3800 POKE 688,0:POKE 689,0
3810 POKE 690,0:POKE 691,0
3820 POKE 692,0:POKE 693,0
3830 POKE 694,0:POKE 695,0
3840 POKE 696,0:POKE 697,0
3850 POKE 698,0:POKE 699,0
3860 POKE 700,0:POKE 701,0
3870 POKE 702,0:POKE 703,0
3880 POKE 704,0:POKE 705,0
3890 POKE 706,0:POKE 707,0
3900 POKE 708,0:POKE 709,0
3910 POKE 710,0:POKE 711,0
3920 POKE 712,0:POKE 713,0
3930 POKE 714,0:POKE 715,0
3940 POKE 716,0:POKE 717,0
3950 POKE 718,0:POKE 719,0
3960 POKE 720,0:POKE 721,0
3970 POKE 722,0:POKE 723,0
3980 POKE 724,0:POKE 725,0
3990 POKE 726,0:POKE 727,0
4000 POKE 728,0:POKE 729,0
4010 POKE 730,0:POKE 731,0
4020 POKE 732,0:POKE 733,0
4030 POKE 734,0:POKE 735,0
4040 POKE 736,0:POKE 737,0
4050 POKE 738,0:POKE 739,0
4060 POKE 740,0:POKE 741,0
4070 POKE 742,0:POKE 743,0
4080 POKE 744,0:POKE 745,0
4090 POKE 746,0:POKE 747,0
4100 POKE 748,0:POKE 749,0
4110 POKE 750,0:POKE 751,0
4120 POKE 752,0:POKE 753,0
4130 POKE 754,0:POKE 755,0
4140 POKE 756,0:POKE 757,0
4150 POKE 758,0:POKE 759,0
4160 POKE 760,0:POKE 761,0
4170 POKE 762,0:POKE 763,0
4180 POKE 764,0:POKE 765,0
4190 POKE 766,0:POKE 767,0
4200 POKE 768,0:POKE 769,0
4210 POKE 770,0:POKE 771,0
4220 POKE 772,0:POKE 773,0
4230 POKE 774,0:POKE 775,0
4240 POKE 776,0:POKE 777,0
4250 POKE 778,0:POKE 779,0
4260 POKE 780,0:POKE 781,0
4270 POKE 782,0:POKE 783,0
4280 POKE 784,0:POKE 785,0
4290 POKE 786,0:POKE 787,0
4300 POKE 788,0:POKE 789,0
4310 POKE 790,0:POKE 791,0
4320 POKE 792,0:POKE 793,0
4330 POKE 794,0:POKE 795,0
4340 POKE 796,0:POKE 797,0
4350 POKE 798,0:POKE 799,0
4360 POKE 800,0:POKE 801,0
4370 POKE 802,0:POKE 803,0
4380 POKE 804,0:POKE 805,0
4390 POKE 806,0:POKE 807,0
4400 POKE 808,0:POKE 809,0
4410 POKE 810,0:POKE 811,0
4420 POKE 812,0:POKE 813,0
4430 POKE 814,0:POKE 815,0
4440 POKE 816,0:POKE 817,0
4450 POKE 818,0:POKE 819,0
4460 POKE 820,0:POKE 821,0
4470 POKE 822,0:POKE 823,0
4480 POKE 824,0:POKE 825,0
4490 POKE 826,0:POKE 827,0
4500 POKE 828,0:POKE 829,0
4510 POKE 830,0:POKE 831,0
4520 POKE 832,0:POKE 833,0
4530 POKE 834,0:POKE 835,0
4540 POKE 836,0:POKE 837,0
4550 POKE 838,0:POKE 839,0
4560 POKE 840,0:POKE 841,0
4570 POKE 842,0:POKE 843,0
4580 POKE 844,0:POKE 845,0
4590 POKE 846,0:POKE 847,0
4600 POKE 848,0:POKE 849,0
4610 POKE 850,0:POKE 851,0
4620 POKE 852,0:POKE 853,0
4630 POKE 854,0:POKE 855,0
4640 POKE 856,0:POKE 857,0
4650 POKE 858,0:POKE 859,0
4660 POKE 860,0:POKE 861,0
4670 POKE 862,0:POKE 863,0
4680 POKE 864,0:POKE 865,0
4690 POKE 866,0:POKE 867,0
4700 POKE 868,0:POKE 869,0
4710 POKE 870,0:POKE 871,0
4720 POKE 872,0:POKE 873,0
4730 POKE 874,0:POKE 875,0
4740 POKE 876,0:POKE 877,0
4750 POKE 878,0:POKE 879,0
4760 POKE 880,0:POKE 881,0
4770 POKE 882,0:POKE 883,0
4780 POKE 884,0:POKE 885,0
4790 POKE 886,0:POKE 887,0
4800 POKE 888,0:POKE 889,0
4810 POKE 890,0:POKE 891,0
4820 POKE 892,0:POKE 893,0
4830 POKE 894,0:POKE 895,0
4840 POKE 896,0:POKE 897,0
4850 POKE 898,0:POKE 899,0
4860 POKE 900,0:POKE 901,0
4870 POKE 902,0:POKE 903,0
4880 POKE 904,0:POKE 905,0
4890 POKE 906,0:POKE 907,0
4900 POKE 908,0:POKE 909,0
4910 POKE 910,0:POKE 911,0
4920 POKE 912,0:POKE 913,0
4930 POKE 914,0:POKE 915,0
4940 POKE 916,0:POKE 917,0
4950 POKE 918,0:POKE 919,0
4960 POKE 920,0:POKE 921,0
4970 POKE 922,0:POKE 923,0
4980 POKE 924,0:POKE 925,0
4990 POKE 926,0:POKE 927,0
5000 POKE 928,0:POKE 929,0
5010 POKE 930,0:POKE 931,0
5020 POKE 932,0:POKE 933,0
5030 POKE 934,0:POKE 935,0
5040 POKE 936,0:POKE 937,0
5050 POKE 938,0:POKE 939,0
5060 POKE 940,0:POKE 941,0
5070 POKE 942,0:POKE 943,0
5080 POKE 944,0:POKE 945,0
5090 POKE 946,0:POKE 947,0
5100 POKE 948,0:POKE 949,0
5110 POKE 950,0:POKE 951,0
5120 POKE 952,0:POKE 953,0
5130 POKE 954,0:POKE 955,0
5140 POKE 956,0:POKE 957,0
5150 POKE 958,0:POKE 959,0
5160 POKE 960,0:POKE 961,0
5170 POKE 962,0:POKE 963,0
5180 POKE 964,0:POKE 965,0
5190 POKE 966,0:POKE 967,0
5200 POKE 968,0:POKE 969,0
5210 POKE 970,0:POKE 971,0
5220 POKE 972,0:POKE 973,0
5230 POKE 974,0:POKE 975,0
5240 POKE 976,0:POKE 977,0
5250 POKE 978,0:POKE 979,0
5260 POKE 980,0:POKE 981,0
5270 POKE 982,0:POKE 983,0
5280 POKE 984,0:POKE 985,0
5290 POKE 986,0:POKE 987,0
5300 POKE 988,0:POKE 989,0
5310 POKE 990,0:POKE 991,0
5320 POKE 992,0:POKE 993,0
5330 POKE 994,0:POKE 995,0
5340 POKE 996,0:POKE 997,0
5350 POKE 998,0:POKE 999,0
5360 POKE 1000,0:POKE 1001,0
5370 POKE 1002,0:POKE 1003,0
5380 POKE 1004,0:POKE 1005,0
5390 POKE 1006,0:POKE 1007,0
5400 POKE 1008,0:POKE 1009,0
5410 POKE 1010,0:POKE 1011,0
5420 POKE 1012,0:POKE 1013,0
5430 POKE 1014,0:POKE 1015,0
5440 POKE 1016,0:POKE 1017,0
5450 POKE 1018,0:POKE 1019,0
5460 POKE 1020,0:POKE 1021,0
5470 POKE 1022,0:POKE 1023,0
5480 POKE 1024,0:POKE 1025,0
5490 POKE 1026,0:POKE 1027,0
5500 POKE 1028,0:POKE 1029,0
5510 POKE 1030,0:POKE 1031,0
5520 POKE 1032,0:POKE 1033,0
5530 POKE 1034,0:POKE 1035,0
5540 POKE 1036,0:POKE 1037,0
5550 POKE 1038,0:POKE 1039,0
5560 POKE 1040,0:POKE 1041,0
5570 POKE 1042,0:POKE 1043,0
5580 POKE 1044,0:POKE 1045,0
5590 POKE 1046,0:POKE 1047,0
5600 POKE 1048,0:POKE 1049,0
5610 POKE 1050,0:POKE 1051,0
5620 POKE 1052,0:POKE 1053,0
5630 POKE 1054,0:POKE 1055,0
5640 POKE 1056,0:POKE 1057,0
5650 POKE 1058,0:POKE 1059,0
5660 POKE 1060,0:POKE 1061,0
5670 POKE 1062,0:POKE 1063,0
5680 POKE 1064,0:POKE 1065,0
5690 POKE 1066,0:POKE 1067,0
5700 POKE 1068,0:POKE 1069,0
5710 POKE 1070,0:POKE 1071,0
5720 POKE 1072,0:POKE 1073,0
5730 POKE 1074,0:POKE 1075,0
5740 POKE 1076,0:POKE 1077,0
5750 POKE 1078,0:POKE 1079,0
5760 POKE 1080,0:POKE 1081,0
5770 POKE 1082,0:POKE 1083,0
5780 POKE 1084,0:POKE 1085,0
5790 POKE 1086,0:POKE 1087,0
5800 POKE 1088,0:POKE 1089,0
5810 POKE 1090,0:POKE 1091,0
5820 POKE 1092,0:POKE 1093,0
5830 POKE 1094,0:POKE 1095,0
5840 POKE 1096,0:POKE 1097,0
5850 POKE 1098,0:POKE 1099,0
5860 POKE 1100,0:POKE 1101,0
5870 POKE 1102,0:POKE 1103,0
5880 POKE 1104,0:POKE 1105,0
5890 POKE 1106,0:POKE 1107,0
5900 POKE 1108,0:POKE 1109,0
5910 POKE 1110,0:POKE 1111,0
5920 POKE 1112,0:POKE 1113,0
5930 POKE 1114,0:POKE 
```

Line 210 starts everything off. The first number in brackets is the address of our machine code. The second is the address — high byte only — of the player missile table, and the final two parameters specify where the cursor will initially appear on screen, low byte followed by the vertical position. The values shown will place a cursor.

You will naturally want to tailor the mouse parameters for your specific application (up to 10 addresses at the top of page 6 are used as registers, and you can change the values in view of them to suit yourself).

Table 1 clarifies the function of each address. 1781 and 1782 are used along with page zero addresses 005 and 006 as counters and pointers.

1781	Cursor init, offset
1782	Cursor init, offset
1783	Cursor window right border
1784	Cursor window left border
1785	Cursor window bottom border
1786	Cursor window top border
1787	Colour window border
1788	Flash rate
1789	Cursor speed
1790	Current horizontal position
1791	Current vertical position

Table 1: The page 0 registers

Don't alter any of these, or the program will crash.

The default values 1783 to 1786 allow the cursor to move anywhere on screen, but you can use these registers to define a restricted window. For example, P0R1 1783.01 will stop the cursor descending into the text window at the bottom of a graphics screen.

Address 1787 lets you use colour, rather than cursor position to detect which menu item has been chosen. When the cursor overlaps one of the four possible playfield windows, either a text menu label or a map mode goal — the number shown in Table 1 is retrieved.

This value is updated only once

Number in 1787	Colour	Register	Function value
00	000.000	1787	Orange
01	000.001	1788	Yellow
02	000.002	1789	Blue
03	000.003	1790	Pink
04	000.004	1791	Black

Table 2: Cursor playfield overlap

during each vertical blank period though the cursor may move several times. You might therefore get an apparently false reading when the cursor is close to, but not actually touching, a playfield object. To

minimise this problem, keep the speed value below 4, and use the centre of the cross, not its arms, to indicate your target.

Address 1788 controls the cursor flashing routine. Its default value is 0, which keeps the cursor unblinking, but any other number will start it flashing at the rate specified by that number. Values between 2 and 8 should prove suitable. The flash rate is also affected by cursor speed — address 1789 — so you will usually need to set these two parameters together.

Address 1789 controls the speed of the cursor movement, and is initially set to 2. It governs the number of times the cursor moves during each vertical blanking interval, and you can modify it to suit your requirements. If you set it to zero the cursor won't move at all, so in a setting of 4 it will move 4 four steps every 58 periods (which is pretty fast).

Unfortunately, since the joystick register is updated only once per 58 periods, the four steps will all be in the same direction. This means in effect that higher speeds give you less control, and make it more difficult to position the cursor very precisely.

1790 and 1791 hold the cursor's current horizontal and vertical positions respectively. This will naturally be those two registers to detect which menu item has been chosen.

The values refer to positions on the player missile grid, and do not correspond to row or column numbers in any Graphics mode. Your Basic program can translate them easily enough into row and column coordinates if necessary.

1792 is also used as a switch. Poke it with 0 to turn the mouse routine off and remove the cursor from the screen. To switch it back on, do another POKE call like the one in line 210, with different values for horizontal and vertical position if you wish.

The additional lines of Basic in this game will show a simple application — using the mouse system to select a colour for the text window. Flip a key switch into port 1 and use it to position the cross anywhere along the menu line you want, then press the trigger. Line 412 contains those the cursor's vertical position, to see which item has been chosen. Then set the selected colour.

Exactly the same principle can be used for more complex menus and, since you can use any Graphics mode, the choices may be indicated by pictures or icons, rather than words.

Although the program is primarily intended to drive a mouse, the fast smoothly moving cross would make an ideal gun sight in arcade type

games, and address 1787 makes it easy to see whether you're on target. Remember that all the instructions for two line resolution P0 graphics have been done for you and players 1 to 3 are available.

Listing 3: Additional program to test mouse system is listing 1

```

100 REM *** P0 test code to program 1 to
101 *** set up a Graphics mode screen
102 REMbers: P0R0 005.000 set word in
103 *** P0R1, after every GRAPHICS command
104
105 REM Set up window for cursor screen
106
107 P0R2 1783.007 REM right hand border
108
109 P0R3 1784.000 REM left hand border
110
111 P0R4 1785.000 REM bottom hand border
112
113 P0R5 1786.000 REM top hand border
114
115 P0R6 1787.000 REM Colour window border
116
117 P0R7 1788.000 REM Flash rate
118
119 P0R8 1789.000 REM Cursor speed
120
121 P0R9 1790.000 REM Current horizontal
122 P0R10 1791.000 REM Current vertical
123
124 REM P0R11 1792.000 REM Mouse switch
125
126 REM P0R12 1793.000 REM Mouse speed
127
128 REM P0R13 1794.000 REM Mouse flash
129
130 REM P0R14 1795.000 REM Mouse colour
131
132 REM P0R15 1796.000 REM Mouse colour
133
134 REM P0R16 1797.000 REM Mouse colour
135
136 REM P0R17 1798.000 REM Mouse colour
137
138 REM P0R18 1799.000 REM Mouse colour
139
140 REM P0R19 1800.000 REM Mouse colour
141
142 REM P0R20 1801.000 REM Mouse colour
143
144 REM P0R21 1802.000 REM Mouse colour
145
146 REM P0R22 1803.000 REM Mouse colour
147
148 REM P0R23 1804.000 REM Mouse colour
149
150 REM P0R24 1805.000 REM Mouse colour
151
152 REM P0R25 1806.000 REM Mouse colour
153
154 REM P0R26 1807.000 REM Mouse colour
155
156 REM P0R27 1808.000 REM Mouse colour
157
158 REM P0R28 1809.000 REM Mouse colour
159
160 REM P0R29 1810.000 REM Mouse colour
161
162 REM P0R30 1811.000 REM Mouse colour
163
164 REM P0R31 1812.000 REM Mouse colour
165
166 REM P0R32 1813.000 REM Mouse colour
167
168 REM P0R33 1814.000 REM Mouse colour
169
170 REM P0R34 1815.000 REM Mouse colour
171
172 REM P0R35 1816.000 REM Mouse colour
173
174 REM P0R36 1817.000 REM Mouse colour
175
176 REM P0R37 1818.000 REM Mouse colour
177
178 REM P0R38 1819.000 REM Mouse colour
179
180 REM P0R39 1820.000 REM Mouse colour
181
182 REM P0R40 1821.000 REM Mouse colour
183
184 REM P0R41 1822.000 REM Mouse colour
185
186 REM P0R42 1823.000 REM Mouse colour
187
188 REM P0R43 1824.000 REM Mouse colour
189
190 REM P0R44 1825.000 REM Mouse colour
191
192 REM P0R45 1826.000 REM Mouse colour
193
194 REM P0R46 1827.000 REM Mouse colour
195
196 REM P0R47 1828.000 REM Mouse colour
197
198 REM P0R48 1829.000 REM Mouse colour
199
200 REM P0R49 1830.000 REM Mouse colour
201
202 REM P0R50 1831.000 REM Mouse colour
203
204 REM P0R51 1832.000 REM Mouse colour
205
206 REM P0R52 1833.000 REM Mouse colour
207
208 REM P0R53 1834.000 REM Mouse colour
209
210 REM P0R54 1835.000 REM Mouse colour
211
212 REM P0R55 1836.000 REM Mouse colour
213
214 REM P0R56 1837.000 REM Mouse colour
215
216 REM P0R57 1838.000 REM Mouse colour
217
218 REM P0R58 1839.000 REM Mouse colour
219
220 REM P0R59 1840.000 REM Mouse colour
221
222 REM P0R60 1841.000 REM Mouse colour
223
224 REM P0R61 1842.000 REM Mouse colour
225
226 REM P0R62 1843.000 REM Mouse colour
227
228 REM P0R63 1844.000 REM Mouse colour
229
230 REM P0R64 1845.000 REM Mouse colour
231
232 REM P0R65 1846.000 REM Mouse colour
233
234 REM P0R66 1847.000 REM Mouse colour
235
236 REM P0R67 1848.000 REM Mouse colour
237
238 REM P0R68 1849.000 REM Mouse colour
239
240 REM P0R69 1850.000 REM Mouse colour
241
242 REM P0R70 1851.000 REM Mouse colour
243
244 REM P0R71 1852.000 REM Mouse colour
245
246 REM P0R72 1853.000 REM Mouse colour
247
248 REM P0R73 1854.000 REM Mouse colour
249
250 REM P0R74 1855.000 REM Mouse colour
251
252 REM P0R75 1856.000 REM Mouse colour
253
254 REM P0R76 1857.000 REM Mouse colour
255
256 REM P0R77 1858.000 REM Mouse colour
257
258 REM P0R78 1859.000 REM Mouse colour
259
260 REM P0R79 1860.000 REM Mouse colour
261
262 REM P0R80 1861.000 REM Mouse colour
263
264 REM P0R81 1862.000 REM Mouse colour
265
266 REM P0R82 1863.000 REM Mouse colour
267
268 REM P0R83 1864.000 REM Mouse colour
269
270 REM P0R84 1865.000 REM Mouse colour
271
272 REM P0R85 1866.000 REM Mouse colour
273
274 REM P0R86 1867.000 REM Mouse colour
275
276 REM P0R87 1868.000 REM Mouse colour
277
278 REM P0R88 1869.000 REM Mouse colour
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Getting inside the console

ANDRE WILLEY takes an in-depth look at the Atari XE systems

FOLLOWING last month's overview of the new Atari XE games console and keyboard, let's take a more detailed look at how it performs and what you can expect if you decide to buy one.

As you probably know by now the XE system is supplied in two versions. The first is the straightforward games console with joystick and built-in Basic Command. In this configuration you could, in fact, add both a tape deck and a disc drive but you are only so able to use them to load pre-installed games.

That said, the difference in cost between cassette and cartridge based systems would surely offset the price of an XC12 tape deck.

The second package comes with joystick, light gun, plug-in keyboard and the Bug Hunt cartridge game making a 544 bit computer which in practical terms is almost identical to the old 800XL. In addition you also get the cartridge version of Flight Simulator II — a very well repeated aircraft simulator game which uses both joystick and keyboard.

Those interested in the games might like to note that Minide Command will run very effectively with a Trakball.

What you don't get however, is a tape deck, which I find a little surprising as this pack is being sold as a programmer oriented one. But you do now have the basis of a complete computer system and you can add

most of the peripherals available for the 5-bit range — but more of that later.

Let's start by looking at the console from the outside. Most of the standard I/O connections are present including the now obligatory two, rather than four, joystick sockets, the 10 pin serial I/O port and the 7-pin Din power socket which incidentally, uses the same power supply module as the rest of the XL and XE range.

Also present are the TV output — phone socket with detachable RF cable — and two new sockets compatible with and also out. These always used to be part of a 5-pin Din socket which also included synchronisation and luminance lockout and brightness signals but neither are all that likely to be missed.

Convenient

The cartridge socket is on the top of the machine as with the XL series and it much more convenient than the awkward rear-mounted system used on the 1300SE. It should take all XC/XE cartridges including the aforementioned bank switching ones such as Action! Mac/MS and EuroSE.

The final socket which has never been featured on an Atari 5 bit machine before is a 15-way D socket to allow connection of the removable keyboard.

Unfortunately for any serious com-

puter users Atari has not allowed any expansion of the machine by rather shockingly creating the parallel bus which has been present on all Atari 8 bit for the last six years. This means you can't add any of the more very expensive memory boards, fast I/O modifications or even such main stream computer products as hard drives.

I find this to be an unacceptable cost-cutting exercise. After all, how much would it have cost to leave a single edge connector — or even the edge of the PCB trail — protruding from the rear of the casing? In order to save a few pence Atari has eliminated the possibility of using the XE console as a serious computer system.

Other than this one little niggly I found the new unit with its elegant detachable keyboard to be a marked improvement over the older machines. Certainly the quality of both the television and composite video outputs show a marked improvement over the rather faint and slightly blurred 1300SE display.

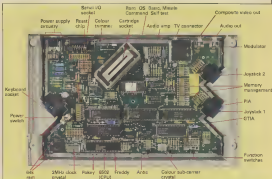
The soldered keyboard has an excellent feel with a light but very good reaction. The layout is the same as that of the 1300SE with the exception of the function keys which are now round panel-headed buttons along the top of the unit. I would, however, have been nice if Atari had included the keys with light the control key graphics and the international character set rather than just the graphic set.

Now let's see what's new under the bonnet — surprisingly little in fact. In essence the only difference you're likely to notice at first is the fact that Minide Command is now built into the machine. This together with Basic, the operating system and the self test routines are all packed into a single 32K rom chip buried into the circuit boards by the factory ship and a couple of memory management support chips.

The power is a separate new check for the presence of the keyboard before enabling what portions of the rom to enable. If there is no keyboard

Current Atari Computers/Console Packages

Model	Includes	Price
XE3030	Console and joystick only	£79.99
XE3097	Console, keyboard, joystick, Flight Simulator II cartridge, Light gun and Bug Hunt cartridge	£179.99
XE3200	Keyboard, XC12 data recorder, 12 games on two tapes	£99.99
XE3091	Light gun and Bug Hunt cartridge	£29.99
1300SE Pack	1300SE 128K computer, XC12 data recorder, joystick and 12 games on two tapes	£139.99
800SE Pack	800SE 64K computer, XC12 data recorder, joystick and 12 games on two tapes + (Diskos/Comps special offer)	£99.99*



All games console internal layout

the default is to run Missile Command. Hold down Option and you'll get the self-test mode. Select games you have (for all the good it will do you without a keyboard) and Start gives a cassette tape.

The operating system

If the OS detects the presence of a keyboard the default power-up is Basic and Option gives you self-test mode. Select gives a full Command Start requests a tape load and, as with previous Atari machines, the buttons may be used in combination — such as Start and Option to override Basic when you load a machine tape game.

The first thing I did when I received my console was to check which version of the operating system was being used. Called May 7 1987 it has the same internal code as the 5200E (520011) but is entitled Version 4.0—I don't know what happened to Version 3. The differences between Version 4.0 and the 5200E OS are purely cosmetic—most of them being in the self-test routine.

The tape's initiative, locations at 55050 and 55055 have been moved to 55050 and 55055 request only and the keyboard template has been altered to

show the correct OE layout, rather than that of the old 5200E. This probably explains the major modifications to the OS which exist at 5C444 to 5C855. However, the first key still doesn't take up correctly on the test.

The power up and system reset routines have some extra code pushed in at 5C856 to take note of the possible new cartridge options—such as loading with Missile Command. I'm not sure why Atari bothered, since the modified handler doesn't seem to be able to cope correctly with the game in any case.

For example, if you boot the system with Missile Command and then press Reset you will be dropped back into self-test and the next time you try you'll be returned to either Missile Command or Basic depending upon whether you have a keyboard attached. Fortunately when you're working in Basic the Reset handler seems pretty reliable.

The only thing worth mentioning is the patch at 5C856 which enables the cassette handler to look for the Start key as well as Return to start cassette I/O. This was added at the last moment after a frantic plea from Atari UK saying that users without the keyboard had no way of being able to load commercial games tapes.

Strangely enough, most of the parallel device driver code designed to interface with the 63,000 parallel bus is still present. All that seems to have been altered are some vectors at 5D40E—on other words there's a large chunk of totally wasted rom inside the 5200 console—besides the self test, that is.

The light gun

The only new item in the package is the light gun and this comes with its own bug fixed game cartridge—the only games currently available. The firing range will depend on your TV set, but I managed to get a comfortable 10 feet away from my 37in screen with no problems.

If you're to believe Atari's adverts it would appear that the gun fires an invisible beam of light at the television screen. This is not strictly true—what actually happens is that the TV set fires a dimly visible beam of light at the gun.

As you will know if you've followed some of the more technical articles in Atari User a TV set works by scanning a pinpoint of light across the screen,

Turn to Page 36 for

Year	1990	1991	1992	1993
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1993	1993	1993	1993	1993

lighting it up as it goes along. This beam starts at the top left and moves across the screen until it reaches the end—at which point it goes back to the left hand edge and starts again on a second later the process has reached the bottom and the whole thing starts again.

Because our eyes don't react fast enough, we see a line of colored energy rather than a fast-moving dot of light. The closer, on the other hand, is so fast enough to see the instantaneous flash of light. When the dot reaches the area of the screen you are at, you're pointing the gun at a small photodiode in the gun registers. The pulse back to the Amdt chip – the computer Amdt then does some pretty rapid calculations to work out where the dot is at that precise moment – and you have your light gun location. Light pens work in much the same way.

This conclusion supports whatever the gun is pointed at the TV set – it is the audience which decides whether

you have pulled the trigger or not. The trigger status shows up very simply as a moment on one of the joystick lines. The switch used is of the normally closed variety so the trigger pressed condition will register a value of 15 at `STICK01` (note: the default result being '0' - exactly the opposite to what you'd expect from a moment).

PEEK

The horizontal position of the gun is always outside by 1000000 (1000000) and the vertical position is at 500000 (500000). The vertical location is altered to use a 0 ring plane. And the top of the screen and 1000000 (1000000) are the bottom.

Increasingly, the gun will register between 88 and 90 on the left of the screen. This value will then increase to about 92 (two thirds of the way across) at which point it will drop back to zero and start counting up again to between 88 and 90.

It's always best to work out the correct values for your own situation – but you must remember to use a formula to calculate the true figures for value. Next month I'll show you

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keep your business profitable.

So much for the hardware, but what does the Atari computer understand who wants to keep up with the Joneses, get for his or her money? Well, you'll get a very attractively designed package with a light gun and Missile Command built in. But more likely for experience in the 3D territory and adding any high speed peripherals. Nothing else you get any form of storage medium such as tape or disk with the package.

Alternatively, you could pop down to your local branch of Dixons or Currys and buy a 650K computer (including an ADP-type disk copystick 70 games) and that all important expansion card needed for £99.99. Then, if you really want one, you can pick up the light gun and the Bug Hunt game for £10.00.

If you like older hard-ware and want a computer system that is looking like it came out very sophisticated, games playing console with an amazing range of inputs, software and the possibility of upgrading to a full computer at a later stage - you've definitely got the right machine.



MILES BETTER SOFTWARE

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 Tel: 01223 326111 Fax: 01223 326112

[illegible]

Picture processor

MOST screen dump utilities work with 40-sector uncompressed files, and this program converts other types of picture files into this form. It's an ideal companion to the poster printer in this issue. Once converted, files will also load into the AtariArtist art package.

Type in the program and use Get a Right! to correct any typing errors. When it's first run you will be presented with a menu of the different picture formats the program can use (see Figure 1). The select option for it you want to use the disc directory.

Once you have chosen a suitable format for your picture you will be asked to enter the source filename—the one you want to convert—and the destination filename—the one you're creating—if the picture. It is important to note that if they are both the same the original will be overwritten.

After the filename has been given the picture will be loaded and you press 0 to save it as a 40-sector file.

GRANVILLE DANBY provides a routine to convert picture files into 62-sector uncompressed form

PROGRAM BREAKDOWN

40-170 Find text
170-210 Get source picture format
220-280 Get source and destination filenames
290-460 Read in and display the picture
470-510 Save the picture out as a 40-sector file
520-600 One directory routine
610-670 Loop to wait for a key input
680-700 The main code path for the file's picture

Graphic Art Department
Paint
Graphic 7 screens

Figure 1: Picture formats that the utility can convert

VARIABLE
DIR Directory letters to read in before picture is loaded
FNAME Source filename
FEXT Short of source filename
DNAME Destination filename

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70 DIM DIR$*****
80 GET A: PICTURE CONVERSION:
90 GET A: IF DIR$=0: GOTO 1
100 GET A: IF DIR$=1: GOTO 2
110 GET A: IF DIR$=2: GOTO 3
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5220 GET A: IF DIR$=513: GOTO 514
5230 GET A: IF DIR$=514: GOTO 515
5240 GET A: IF DIR$=515: GOTO 516
5250 GET A: IF DIR$=516: GOTO 517
5260 GET A: IF DIR$=517: GOTO 518
5270 GET A: IF DIR$=518: GOTO 519
5280 GET A: IF DIR$=519: GOTO 520
5290 GET A: IF DIR$=520: GOTO 521
5300 GET A: IF DIR$=521: GOTO 522
5310 GET A: IF DIR$=522: GOTO 523
5320 GET A: IF DIR$=523: GOTO 524
5330 GET A: IF DIR$=524: GOTO 525
5340 GET A: IF DIR$=525: GOTO 526
5350 GET A: IF DIR$=526: GOTO 527
5360 GET A: IF DIR$=527: GOTO 528
5370 GET A: IF DIR$=528: GOTO 529
5380 GET A: IF DIR$=529: GOTO 530
5390 GET A: IF DIR$=530: GOTO 531
5400 GET A: IF DIR$=531: GOTO 532
5410 GET A: IF DIR$=532: GOTO 533
5420 GET A: IF DIR$=533: GOTO 534
5430 GET A: IF DIR$=534: GOTO 535
5440 GET A: IF DIR$=535: GOTO 5
```

SINK THAT SUB!



Spoiled for choice?

Steve Gold explains what to look for when buying your first quality modem

WHEN I bought my first modem — way back in 1983 — my choice was fairly limited, mostly in terms of price. In 1983 the modem market for Atari computers was split into the sub-\$100 bracket for acoustic 300/200 and 1200/75 based modems, while you had to look at spending £200 or more even for a single direct-connect no-bell model.

Today the situation is very different. Modems are even being given away by some online services in a bid to get subscribers to sign for the dotted line for a year or more.

So what criteria should the beginner apply when he sets out to choose a modem?

To my mind (and I would stress this is a personal opinion only) — based on several years' usage — the key factors to be borne in mind when choosing a modem are — in no particular order — price, Hayes compatibility, ease of use, and reliability of construction.

As with most things, price is a major factor in the modem market. Ignoring the cheaper modems (which are generally coated in with your first year's subscription to the service offering it), the cheapest modems on the market today start at around the £75 mark.

For your money you usually get a development unit, ie. modems that plug straight into a telephone socket that has a simple switch taking it on or

off line as required. Most of the modems in this price bracket work at 1200/75.

For the beginner, such modems are ideal for the first few months, but automated logons — so necessary for the smooth operation of communications programs — take a lot of time and effort for these novices. The route to automated logons is good communications software and Hayes compatibility.

The Hayes standard — sometimes called the Hayes protocol — is a simple modem control language first used by the Hayes modem corporation in the US. Developed by Banning Hayes, the modems carrying a carrier it first appeared in Hayes modems in the early part of this decade.

As with all good ideas the Hayes command language is fairly simple by design. All commands to the modem (other in an off line state) are prefixed by the command AT (short for atten-

tion) and subsequent commands are unabbreviated. A list of the basic commands in the Hayes command language set is given in Figure 1.

Unlike several other proprietary modem control systems of its genre the Hayes command set was placed into the public domain by Hayes, so that other modem manufacturers might adopt the standard — thereby making it universal.

The idea caught on and by 1988 the majority of modems (so high priced modems on sale in the US had some form of Hayes command language built into them).

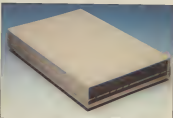
At that time modems were only just beginning to penetrate the home and small business user market in the UK. As with most American originated ideas (good or bad) it took a few years for the idea of Hayes compatibility to

Start in Page 28

A	Answer call
C	Carrier on/off (C=ON, C=OFF)
D	Modem dialing prefix
E	Auto commands (E=ON, E=OFF)
F	Auto data (F=ON, F=OFF)
H	Auto modem off line (ring up) — used in conjunction with +++ command prefix — see below
I	Display identity (I=0 F, I=1 F, I=2 F)
L	Send local address (L=0, L=1, L=2)
M	Modem status (M=0, M=1)
N	Display local number stored
O	Go online
P	Auto dialing prefix
R	Reverse to answer after dialing
T	Turn dialing prefix
W	Wait for secondary dial tone
Z	Modem tests

+++ instructs modem to interpret next command string locally and not transmit the string. Usually used to take modem off line using the H command above. For example +++ATH. This command will only vary from modems to modems.

Figure 1. The basic Hayes command set



The Hayes Smart

From Page 27

percolate through to the UK modem market.

By 1988, the Hayes command language was beginning to appear in several high and £200-plus modems and – at least – people were beginning to realise what a useful facility the Hayes command set is.

Today most modems priced above the budget market (£20 to £100) are Hayes compatible, or have a low-cost option for the facility to be fitted by the modem manufacturer.

Ease of use is another important criteria that is often overlooked by many modem buyers and, alas, many modem designers themselves.

Hayes compatibility is a major step towards ease of use but some designs, which shall remain unnamed, have a transparent control system that defies all logical explanation.

Because the Hayes command language is so comprehensive, most of the modems on sale today only need one control switch on the set itself – the 'revoff' switch – the remainder of the modem controls can easily be handled by a series of Hayes commands piped down the modem's serial port.

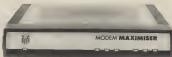
Like a good car, the quality of a modem's construction – its pedigree if you like – can usually be spotted by casual examination of the case.

Full-size units such as all-purpose work-alike the point where sockets or retaining clips are fitted, along with a bag fitting generally tend to indicate a modem is not professionally produced. If it is relatively new on the market, the casing's lack of finish may be due to the modem being hand-built but you should question your dealer thoroughly as to the number sold and the number of attempted repairs.

If the modem looks badly finished and has been on the market for some time, it is best to spot the unit as flawed or a better one. The **BAUD** modem approval regulations – as well as your government rights – forbid you to return to the modem box, so the internal construction can only be easily assessed by its outward appearance.

For illustrative purposes only I've chosen the Pace Lunet Hayes-compatible modem to look at and explain how the theory behind this article comes into practice.

The Lunet comes in a small beige box about half the height of a modern Atari case drive, and with about the same footprint. On the front of the unit is a grey-green display panel along



The Pace Lunet Modem Maximiser

with six red status lights which indicate the current state of the modem.

As well as using the Hayes command set, the Lunet is capable of pulse and tone dialling – useful for speed-dialling on most modem telephone exchanges and office PBXs.

Limited speed buffering is available so that if you wish to communicate at 1200 baud full duplex consistently

with a modem, the Pace Lunet is unique, usually one is required. Cost considerations in this part are often passed on in increased system and business (big) specific modem components.

The software – which occupies a single file space on the modem's ROM – functions in a similar fashion to your Atari's Basic interpreter translating the Hayes commands into direct instructions to the modem components.

Modems are changing all the time and recently another manufacturer – Miracle Technology – unveiled an add-on the Modem Maximiser.

Designed to complement any Hayes-compatible modem, the Maximiser adds 1200-9600 baud extra for the data compression option and adds a range of features to even the most basic of Hayes-compatible modems.

Features of the Maximiser include: flow-control to Modem, Epp and Xmodem protocols; data compression and expansion; data storage – a 1kb serial buffer comes as standard, 1600 baud speed buffering, and a serial-to-parallel or vice versa port for connection to a printer in the absence of your computer being switched on.

Although the Maximiser is a rather pricey addition for many modem owners, it does indicate the way that the modem market is going. It seems more than likely that, at least some of the features found on the Maximiser will be incorporated in future generations of modems, in much the same way that the Hayes command set is almost universal in today's quality modems.

‘The internal construction can only be assessed by its outward appearance’

(possibly due to a software freeze) the modem's 1-baud data device by its three signals, 300 baud full duplex, 1200/75 baud and 2400 baud.

The Lunet also features, call me, taking via an external loudspeaker and external antenna system, the modem can recognise it-4 (excepted and under) single rate tones found on the telephone network by attaching special hook-cables via its serial port, the modem can signal to your Atari using the universal 2400 of the net. This option is used at some communications software packages for unattended auto-dialling.

As with many modems in the £100 to £180 price bracket, the Lunet is auto answer and can thus be used as a computer-based bulletin board system.

Also like several of the latest gener-

Further details are available from:
Pace Lunet: Pace Micro Technology
Aderton Road, Airdrie, G71 9JG
Tel: 0224-688773
Modem Maximiser: Miracle Technology, 81 Peters Street, Ipswich, IP1 1QJ
Tel: 0603-258161

Programming the easy way!

LEN GOLDING takes you on a journey into the wonderful world of Atari Basic

By this time we are well on the way to exploring the wonders of Atari Basic home-square one, and showing how even an absolute beginner can quickly learn to produce interesting and worthwhile programs. We start by explaining some of the fundamental things they don't bother to tell you in the manuals, then progress to second-order graphics and some advanced programming techniques.

First let's assume that all you've read are the booklets which came with your computer — so you know how to plug all the various bits and pieces together, can find your way around the keyboard and maybe you've tried typing in one or two of the sample programs. So now what? Where do you go from here?

The Basic reference book gives you a list of words that the computer can understand! But it doesn't try very hard to make these comprehensible to humans. Terms like variable, string, function, register, channel and GOS are liberally sprinkled around and there's little attempt to explain what they are or tell you how to use them.

As an example, try reading the section on COLOR and SETCOLOR — you'll soon see what I mean.

Fortunately, programming isn't nearly as difficult as it looks. Basically, observe the pun — it's all about following strict rules. Once you've learned the rules and can apply them, usually your computer will turn out an elegant, elegant child of an unassuming little machine.

So let's start at the very beginning. We're going to write some programs, nothing more than a set of instructions played in a way that the computer can understand and arranged in a carefully, limited set order.

Every program consists of at least one group of lines, which may consist

as many as 100 characters — letters, numbers or symbols — as it could easily stretch up to three lines on your TV screen.

Every program line must start with a line number, and the computer automatically shuffles the lines around in its memory so that they are always arranged in numerical order, with the lowest first. Plus, we'll happen ourselves of the order in which you typed the lines.

Every line number must be followed by at least one command, which might be a single word such as PRINT, GOTO, REM or END, but will usually have extra letters or numbers tacked on to it. Some examples are:

```
1000 GOTO 1000
1010 PRINT 1
1020 PRINT C
1030 PRINT
```

Don't worry if this still looks like a foreign language — we'll explain it all shortly.

Every command line obeys rules which tell you what extra bits and pieces have to be tacked on and the order in which they must appear. These are known collectively as the rules of SYNTAX, and if you get them wrong the computer will not accept your program line when you hit the Return key. Let's pause for breath and look at an example.

```
10 PRINT "HELLO"
```

This is a valid program line which your computer will understand and obey. It starts with a line number — 10 — then it has a command, PRINT, followed by an extra group of characters, HELLO.

The rules of syntax for the PRINT

Run to Page 47 in

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— *PC World*

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← From Page 38

comment state that if you want to print a group of characters exactly as they appear on the program line, you must enclose those characters in inverted commas. If you leave the commas out, the computer will misunderstand your intention and print the number 5. Why does it do that? Read on.

There are two other terms you need to understand before you can write any worthwhile programs. Namely, variable and string. Let's look at numeric variables first.

Every numeric variable has a name, such as *X* or *LIFE* or *LEWEL*, and a corresponding numeric value such as 5, 0.50, -100 or \$6000000. Remember how in algebra you can write let *X* = 50? Well, to your computer the letter *X* would be a variable name and the number 50 would be its value.

The name remains constant throughout your program but its value can change as many times as you like. So whenever you tell the computer to print the value of *X*, it will print you the number that it represents at that particular moment.

A variable name need not be a single letter, but it must begin with a capital letter, and can contain only capital letters or numbers — symbols such as *+*, *-*, or *** are not allowed.

If we go back to our previous example, `PRINT HELLO`, you will recall we said that leaving out the inverted commas would make the computer use the number zero. Now can you see why?

It is because the computer will assume that `HELLO` — without inverted commas — is a variable name, so it promptly starts to search for the numeric value which `HELLO` represents. It won't find one, so it assumes that the answer must be zero. Now therefore get it printed on the screen much to your annoyance. You have a small change can produce major differences in the computer's behaviour?

We reduce the variables used here but now let's turn to the related subject of strings. A string is a sequence of characters grouped together in one unit you store. This month we'll look at the two main types: literal strings and string variables.

A literal string is a group of characters enclosed by inverted commas — like `HELLO` — or, so to no good use. Unless you tell it to print a literal string, the computer will print

everything inside the inverted commas exactly as it appears in the program line. You can put almost anything in a literal string apart from the double quote character (") itself because with a line and tab.

String variables are a lot harder to understand, but like name-variables they have names made up from capital letters and numbers, but all string names must end with a dollar sign \$, for example:

```
IS
NAME
ADDRESS
```

Each name can represent a group of characters. Literally, for example, that you have a variable called *AS* which contains the characters `READY FOR ACTION`. If you now tell the computer to `PRINT AS` it will respond by printing `READY FOR ACTION`, just as though you'd told it to print the characters themselves. The variable name and its contents are never changeable so as far as the computer is concerned.

Suppose though you had told it to `PRINT AS`. What do you think you'd get, and why?

As with name-variables, the name which identifies a particular string will remain constant though its value — the characters in the string — can change. So at the beginning of your program a string variable called *UNDESTRUCT* might contain the words `ALL UNDESTRUCT` whereas the end of the program it could contain `NO UNDESTRUCT`.

The related thing about string variables is that you can't just write them straight into a program. This is because your computer needs to know how much memory it must set aside to hold the string's characters. If you had a program line like this:

```
"IS IS IS IS IS IS"
```

You would need to reserve space for at least 14 characters — 12 letters and three spaces.

This process of reserving memory is called *dimensioning* — for now, don't mind — and there is a special command — `DIM` — for doing it. To reserve space for up to 20 characters in a variable called *AS* you would type

```
10 DIM AS(20)
```

For up to 60 characters in a variable

Save to Page 42 P

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Once a string variable has been dimensioned you can specify its contents in a number of ways. Here are two small examples:

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It establishes a direct link between you and the computer, and whatever you have typed will be called **RAMDISK** for the duration of the program — so don't lose **RAMDISK** unless you're happy to be stuck with it!

Numbers and string variables are among the most difficult things to master when you're starting out at first, but you must understand them before you can program very far. So why not read through this article again and have a go at writing a few examples of your own?

■ Next month we'll look at a few more interesting commands, including the `SOURCE` statement, and show how your knowledge of variables can be put to an interesting use.

The truth about TELEX

[illegible]

If you too) is a male and appreciate female...
subscriptions in this field. A magazine and a subscription to Microsoft
books is just one of a growing number of support available to Alan and his
Microsoft ally. Microsoft you can also send the news in its home. So interesting
in our goal post I send you about and technology and electronic mail. You would
yourself otherwise have trouble keeping up with all your needs and much more

[illegible]

Your HINTS & TIPS

The Price of Magic

WHEN you do enter **RESTORE**, then when the Lancelot screen appears get it wrong three times. This game will restart at the point where you died and you will have 251 attempt points and all your equipment.

You can do this every time you die giving you infinite lives to allow you to complete most of the game easily. — **Daniel Welsh, Rowley Regis, West Midlands**

Bounty Bob

Strikes Back

When you have collected the flower pot on the first level, press number one on the keyboard. Now press four and you will move to level four.

On level five if you collect the coffee pot and press eight followed by Start you will jump to level eight. — **William Donald, Turf, Aberdeenshire**

Encounter

AS soon as you feel or see a invisible thing towards you put your tank into full reverse and start firing. This is the best manoeuvre when trying to dodge it.

After completing a game you have to go through the black hole. Look between the right and left when you see an infrared appear. Have the joystick

to one side and you should be able to avoid it without having to move around too much. — **Gonophy Benn, Middlesbrough, Cleveland**

Pole Position

SELECT back one the righting race and at the beginning of the game position your car in the centre of the track. This way no cars can hit you and you can sit back with the momentum of effect and watch the points accumulate until all the laps have been completed. — **Michael Host, Gresham, Wilt**

Quasimodo

HERE is a cheat that will allow you to miss all the archers climbing the ladders.

After getting the first jewel on the second level run to the opposite end of the screen where the great ones

a merchant intelligence you must collect the metal detector at location 08-08. This will cause Garmen's screen to change to blue when you are near an installation.

The metal detector will also let you know when you are near a Polter building by glowing green. If it glows red the building is not owned by anybody.

To avoid having your craft blown up when you are attacked on the ground press 1 to leave it. You are shot but your craft is left intact. Finally, your weapon craft is at location 13 and you have to use the elevator at location 9-05 to get to it. — **Ruth Jones, Heston Moor, Stockport**

are. Jump in the air and the jewel will automatically be placed in the first case for you.

What appears to be a ghost door will appear nearby — go through it and you will be transported to the next level. — **Michael Cain, Searles, Nottingham**

Ghostbusters

WHEN you are just starting and the computer tells you if you have a level account enter the following code without a star: 2123344. This will give you 250000 in your account and you will be able to sit yourself out with all the best equipment. — **J. Speed, Searles, Nottingham**

Beer Belly Burt's

Brew Biz

ON certain random look for walls next to the platforms. You can jump over them and get off the extra skipping several screens. — **Daniel Welsh, Rowley Regis, West Midlands**

The Pay-off

HERE is a cheat for the adventure game that came free with most Amstrad systems.

Once the main program has loaded remove the disc from the drive. If you are asked during play you will be asked if you want to try again.

Entering Y will make the computer attempt to locate the disc without success. Half the title screen will appear with the prompt When Here? and you have been returned to Lugo's betting shop.

To finish the screen and remove the title, type 0 to move on. All the other game elements will remain unchanged. Objects will be in the same locations and condition they were left in from the previous game. — **R. Clarke, Solihull, West Midlands**

One on One

ON the early card for the topic jump on there is a mistake. It says that you should press 1 or 2 for a throwout. It should say: Press 0 for 100 or 2 for 20. To give the game out. — **Chris Jones, Welling, Kent**

Mercenary

AFTER getting the disks — the fastest ship on Tang — go to the colony orbit, then enter the station and take the sink. It will allow you to pick up almost any object you like.

You can now pick up the soldier's wife which will act as a skeleton key and you will be able to open any door. Because of this you can drop the rest of any keys as you don't need them.

On the edge of the sky you should see another ship flying around — go up so it will take it to get a lot more speed. If you wish to fly it you must go to a hanger, drop it and board it. If you drop it anywhere else it will just fly away.

To be able to tell when you are near

LEN GOLDING gives you the lazy approach to computing

EVER since man first poked his enemy with a stick, the subject of remote control has fascinated the human mind. You can switch on your television or video, open your garage doors, lock your car pilot model aircraft and do a host of other clever things without leaving the spot.

But this somewhat revolution seems to have bypassed the computer world. So here is a gadget to alert you on the right road — it's a simple remote control device which lets you send remote open to your computer from a distance of up to ten metres.

It can add an extra dimension to audio visual displays in schools or staff training centres, by allowing you to step through a preset sequence of slides or computer animated drawings at the touch of a button without any tedious wires.

It can also be used to trigger any of the power control gadgets described in previous issues, so you could switch mains or battery powered appliances on or off without going near them. It can even be made to operate as a stand-alone unit to



The sound way to take things easy

switch appliances on or off without the help of your computer.

We've chosen an ultrasonic system for various reasons. It's cheaper and simpler than radio control, and beams infra-red or laser, cost of operation and susceptibility to extraneous fac-

tors from the outside world.

There's also no risk that I will accidentally change channels on your TV, controls it is reliable, or activate your video. It uses a single channel channel, but this is adequate for many purposes, as we'll explain later.

Figure 1 shows the transmitter. It's a simple oscillator which can be adjusted for VHF to generate any frequency from around 26.8kHz to 480kHz, so it can be tuned precisely to the ultrasonic receiver's optimum frequency. Figure 2 shows the receiver, which is a little more complex in design.

TR1 and TR2 form a simple but powerful amplifier, which converts the tiny output from the ultrasonic transducer into a respectable voltage swing at the input of IC1. This IC is a phase locked loop driver, whose output goes low whenever a signal of the correct frequency is received.

It serves three purposes. First as an audio hi-fidelity converter, second as a current amplifier and third as a filter which rejects any spurious incoming frequencies.

Construction of both boards is easy, especially if you use the ready-made PCBs available from R4 Design. Alternatively you may prefer to etch your own from the patterns at Figures 3a and 3b.

The transmitter board layout is

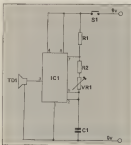


Figure 1. Circuit for transmitter.

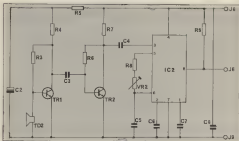


Figure 4: Circuit for the Tx

push is Figure 4. It is designed to fit into a small case supplied by Melex Electronics, but could easily be adapted to suit other boxes if necessary.

The switch is a high quality push button type, which is sturdy enough to hold the entire board firmly in place, but we've included four mounting holes in case you want to use a different switch or box.

Make sure that IC1 is inserted with pin 1 in the correct position, but all the other transmitter components can go either way round. TR1 is the ultrasonic transmitter, and is marked with a T. You can attach it directly to a 2-way PCB terminal block as shown in Figure 4, by bending its leads at right angles.

Alternatively solder on longer leads allowing enough space to allow for adjustment of its position in the hand-held box. The battery leads must be soldered to vias, or directly to their pads.

The receiver board layout is shown in Figure 5. The only polarized components are TR1, TR2, IC2 and C2. The transistors will only fit one way round. IC2 has a small notch in one end, as shown in Figure 5, and C2 has a dot shown to mark the 0+ side. All other components can go either way round.

As with the transmitter board, the ultrasonic transducer TR2 can be wired to a two way terminal block, or

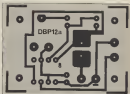


Figure 5a: The PCB transmitter portion

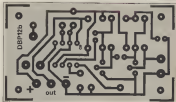


Figure 5b: The PCB receiver portion

Return to Page 52-3

PARTS REQUIRED FOR ULTRA-SONIC SWITCH

TRANSMITTER

		Maplin Code
R1	1k Resistor (brown/black/red)	M18
R2	10k Resistor (brown/black/orange)	M128
VR1	4K7 10w potentiometer	UW52C
C1	50V 100µF Mylar (marked 100M)	8W45R
S1	Push to make switch	PM61R
IC1	74LS00C	PA76H
TU1	10pin 5vdc transistor (see *)	
	RF3 battery lead	RP38P
	RF35 battery	PL62S
	8-pin DIN socket	BL17T
	Small 10mm box (optional)	FT21U

RECEIVER

R3	10k Resistor (brown/black/orange)	M18
R4	47k Resistor (blue/violet/brown/orange)	M47R
R5	1k Resistor (brown/black/red)	M18
R7	10k Resistor (brown/black/orange)	M128
R8	10k Resistor (brown/black/orange)	M128
R9	4K7 10w potentiometer	UW52C
VR2	10k horizontal preset	UH005B
C3	100mfd 15v single ended	PT13L
C4	2n2 ceramic	80274R
C5	22n ceramic	80275R
C6	1n2 ceramic	80280R
C8	0.1mfd disc electrolytic	TR70S

C7	0.02mfd Mylar (marked 2240)	W403C
C8	0.01mfd Mylar (marked 1000)	W401U
T81 T92	BC108C	Q833L
IC2	HE507 tone decoder	Q866A
T00	Ultrasonic receiver *	
	3-way PCB terminal	8K75P
	3-way PCB earth nail (optional)	FT284

* Note: The ultrasonic transducers are sold as a pair - order code HY12N

All components are available from
Maplin Electrical Supplies
P O Box 3, Rayleigh
Essex S58 8LR
Tel: 0223 802911

Printed circuit boards - order code DSP12a and
DSP12b 1/4 inch 0.38 pitch. Joystick extension
lead - order code AT1111 Price £2.50 Available
from:

I.H. Design
27 Spencefield Avenue, Harrogate
North Yorkshire HG2 7NS
Tel: 0432 508288

Photos include VR1 and socketage



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ATARI USER Classifieds

Has upgrading your computer given you hardware you no longer need? Or have changing interests left you with unwanted software? Then **THIS** is the place to advertise your surplus items. *Atari User* readers are always on the lookout for a bargain and this is the first place they look!

An added bonus!

Your ad will also be automatically displayed on *Starlink*, the electronic mail service operated in association with Telecom Gold. This means it will be seen by thousands of computer enthusiasts who can send an instant response.

Classified advertisements will be accepted under the following conditions:

- This service is **EXCLUSIVELY** for the use of private readers. No trade ads will be allowed.
- To avoid embarrassing software piracy, all ads will be carefully vetted before they are accepted.
- Ads can only be accepted on this form (or a photocopy of it).
- There is no maximum to the number of words you include in your ad. If there is insufficient space on the form, continue on a separate sheet of paper.
- The cost is 20p per word, with a minimum of 10 words.
- We **GUARANTEE** your ad will appear in the February issue (on sale January 20) providing it is received by December 20.

- 1300e disc drive, data recorder, joystick, software books £225. Tel: 0248 773898.
- Atari 800C, 1050 disc drive, cassette player, joystick, £1000 + worth of games all later dates £250. Tel: 01 328 3248.
- Atari 800C, 1050 disc drive with Hyperdrive enhancement and 30 software titles £360. Tel: Southfield 04940 8581.
- Complete software for sale - a.s. for just to Jean Belings, 87 Peter house Close, Middlesbrough, 24 Feb.
- Atari 1300e 130A computer disc drive, joystick, 312 cassette deck over £250 worth of software books, rings were good condition, all the for for £200 o.n.o. Tel: Daniel 0824 825768.
- Atari 800 1050 disc drive, 48k ram expansion boards, also keyboard and connector strip for Atari 800 £95. Tel: 0273 897047 after 5pm.
- Catech 126D NLS Epson compatible printer £120. Also assembler cartridge £12. Also many assembler disc £18. All with manuals. Tel: 0285 745035.
- 1050 disc drive, XC12 cassette, various software (all new) offers! Tel: Northwood Water 35021.
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- 1050C + disc drive + XC11, magic games.
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- For sale Atari 1300e, 1050 recorder, 1050 disc drive, 1027 printer, joystick, all boxed, rings, pens, and start-up kit, Mini Office I + software £299. Tel: Rose 01 542 7382.
- Atari 1300e 1050 disc drive with 'Ignite' enhancements. Some software £120. Buyer collects. Tel: Henwood 218112.
- 1300e, 1010, 1050 drive, 80k pageout files, disc box, magic ring, joystick, blank discs, worth over £500 will sell for £225. Tel: 0896 757303.
- Atari touch (tele)aid software £28. Plus original disc and cassette software from £10 to £50. Tel: 0203 210487.
- Atari 1027 printer £80. Tel: 075096 6071 evenings.
- 800C, 1050 disc drive, original software, boxed £700 o.n.o. Tel: Meg on 0243 804858 after 7.30pm.
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Signature

Name

Address

Please contact me at

POST TO: Atari User Classifieds, Europa House, Ashington Park, Ashington, Northumberland NE11 6DT

LET'S start with an easy query from Mr. R.L. Edwards from Windsor Hill, Connecticut, who writes:

"I'm in the middle of designing a large database program on my 1300R. But I've found a problem."

When someone runs the program he can enter almost unlimited information because the text is stored in a very long string. That is obtained by the following code:

```

100  A$=""
110  FOR I=1 TO 255
120    A$=A$+CHR(I)
130  NEXT I

```

But line 120 takes about two seconds to execute, so please could you give me an alternative method—possibly by programming it in machine code form?

Using machine code in this case would be rather like using a stapler instead of making a nail in fast time. A few string handling functions have a better movement into side effect which will solve your problem much more easily. We have reached safety on the technique before, but it is so useful that it could do with more explanation.

When copying between two strings using a statement like LET A\$=B\$, Basic simply takes the first character from B\$ and places it in the first position of A\$, and then repeats the process for the second, third, fourth and so on until the whole string is copied.

Alternatively, it is quite possible to copy the data using pointers inside the original using the normal subscript notation. For example to copy B\$ to A\$ in position two of A\$ you would use A\$(2)=B\$.

If you prefer to think what's happening here you will use the answer to your query a just around the corner. Character one from B\$ is copied in to position two of A\$, then B\$(2) is copied to A\$(3), B\$(3) to A\$(4) and so on until all B\$ has been copied.

The tricky trick comes when you are copying a string onto itself in two memory—using A\$(2)=A\$. Firstly character one from A\$ is copied to position two. Next character two— which we have just transferred from position one—is copied to position three. This new character at position three is copied to four, and so on until the end of the string.

The final effect is that character one is copied to position two, then three then four and so on until the whole

SOFTWARE Solutions

Your programming problems solved by **ANDRÉ WILLEY**

string is filled with the first character—rather like tapping a line of dominoes. So in your example try the following:

```

100  A$=""
110  FOR I=1 TO 255
120    A$(I)=A$(1)
130  NEXT I

```

Don't forget to set up the length of the string by setting to the very last character as shown in line 120, which means the string copy will stop as soon as it thinks there's no more but giving only a copy of a single character.

To store you have it—a very simple and rather elegant method of filling a string with anything you want with it.

Type-in trouble

Now a letter from Steven Taylor from Essex who seems to be having some difficulty with one of our longer programs.

"I have an 80081 with a 1600 disk drive, and have been buying files later than the very last issue. I quite often lay in the backlog but I've been having a little difficulty with *Chopper Annual News* the September 1987 issue.

I had been typing for some time and had almost finished when I got an error if as I tried to enter line 6700. My book says that the means 1600 means sometimes greater than 1599, but I've counted and there seems to be far less.

Is this due to a fault in my machine, or does the game require more than 655 to run? I assume that it does work correctly with the 80081."

Although the solution to your problem is straightforward, the cause is rather more complex. First of all let's discuss some of the possibilities.

There is no fault in the game, and it should run quite happily on a 640, 8000. Also there are not more than 1599 characters in the program—so why does the error occur?

The answer lies in the way in which Amiga Basic functions. Using a system known as tokenisation. All this means is that after you've typed in each line, Basic converts all that long-winded text into a much shorter set of symbols.

For example, when you type REM, Basic will store it as a single four-byte word. Similarly DATA would give a value of one, INPUT two, COLOR three, and so on.

Another way in which it packs your program is into a smaller space is by using a pointer technique with variable names. You may find variables with names such as MYDISPLAY\$ and CUSTOMPRG\$ are useful but they waste an enormous amount of memory. Just think if you used them each 26 times in your program you'd have just wasted half a kilobyte of RAM. It is obviously far more convenient and compact for Basic to store the name just once and use another one byte token whenever it needs to refer to it.

Each time you type in a new variable name in you have a program in the computer will set up an entry in a special table—called the variable name table—and this tokenised line will just contain a reference number. This whole table is always stored with the program when you save it and, in fact, there are only two ways to remove it—

Turn to Page 84

regard to the personal situation, the main support and business writing desktop word processor.

I realise that if such programs are available I would also require a printer and other suggestions would be appreciated. — G. Hallen, Blackwood, Lancs.

■ An ideal product for you to buy to help you with your business is **MS-DOS 2.0**. It is disk based and uses your word processor, spreadsheets, database, label and file, graphics package and communications programs at only £79.99.

It is designed to work with an Atari 1020 or Epson compatible printer. The result will plug straight into the serial port on your Atari, but other printers need an Atari 820 interface card or some other suitable serial interface before you can use them.

There is a review of the handsome **EX-FRONT** — an Epson compatible printer — in the October 1987 issue of *Amiga* too.

ATARI USER Mailbag

WE welcome letters from readers — about your experience using the Atari Mailbag about tips you would like to pass on to other users and about what you would like to see in future issues.

The address to write to is:

**Mailbag Editor
Atari User
Europe House
Addington Park
Addington
Maidenhead SL6 5AP**

Booting with Basic

I OWN an Atari 8000, and have an almost useless option for Atari User. I used it for a while, but the Atari Basic manual, I found it with the old **Atari 8000** and it was a bit of a struggle to understand in the beginning.

When I found my memory I got on screen the program **Atari 8000** and it was a bit of a struggle to understand in the beginning.

However, I have found it very useful in the past.

I have found it very useful in the past.

■ You will find it very useful in the past.

When the **Atari** program attempts to go to Basic, it

Getting it quite right

First, just found in the published review of **Atari 8000** program, and I think it is really good. I recently was able to tell it up already rather than having to use **Atari 8000** everything.

However, I don't seem to be able to check it out properly — after with the old or data programs. Both of them the same error (on **Atari 8000** and **Atari 8000**). On **Atari 8000** I can get the same error (on **Atari 8000** and **Atari 8000**).

There are also the only **Atari 8000** lines and the only seems to work. And I don't seem to be able to get the same error (on **Atari 8000** and **Atari 8000**).

After just found in the published review of **Atari 8000** program, and I think it is really good.

I recently was able to tell it up already rather than having to use **Atari 8000** everything.

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There are also the only **Atari 8000** lines and the only seems to work. And I don't seem to be able to get the same error (on **Atari 8000** and **Atari 8000**).

After just found in the published review of **Atari 8000** program, and I think it is really good.

Switching Dos formats

Is there a utility available that will allow me to convert **Dos 3.3** files to a **Dos 2.0** format? — James Harvey, Hammersmith, London.

■ The **Dos 2.0** master disc programs in the **CD-ROM** which will allow you to do this. You will also have the enhanced data available and other full compatibility with **Dos 2.0**.

Auto line numbering

I AM a member of the **Atari 8000** and I am still learning how to use it. I am able to use the facility of auto line numbering and

After just found in the published review of **Atari 8000** program, and I think it is really good.

■ In the August 1987 issue we published a utility to convert **Atari 8000** programs to **Atari 8000** format. It will allow you to convert **Atari 8000** programs to **Atari 8000** format.

Basic facts in Basics

I AM a member of the **Atari 8000** and I am still learning how to use it. I am able to use the facility of auto line numbering and

After just found in the published review of **Atari 8000** program, and I think it is really good.

in progress out of books? — Richard Lawson, Hester, Maryland

■ All Decca are different, although most are based on a dialect of the language developed by the Microsoft Corporation. Nearly all public domain outside those dedicated purely for your computer feature programs written in the most common sign of Decca, the Basic.

Unfortunately, Alan Basic differs from most of them so you will have to rewrite the program listings to a style that Alan Basic will accept.

Computer comparison

Can you please explain the difference between the 800XL and the new 85XL computer. Is the 85XL as reliable and fast as the 800XL?

At 280 it seems a very good buy and it can do all the things the 800XL can do with a good starter price. — J. L. White, Haverden, Chesh

■ The 85XL computer and the 800XL are very similar in each other. The major differences occur in the physical design and layout of the micro. On the 800XL, the cartridge socket is on the top but on the 85XL it is positioned at the rear.

The parallel bus that featured on the 800XL is not on the 85XL, but does it save the expansion slot that appeared on the 800XL?

Serious searches

I RECENTLY visited a friend's home with a database program to store my friends' names and addresses on my Atari 800XL.

The main program gave me no problem, but when I came to writing a routine to search through the names to find one, I struggled.

Differing TV systems

One day I was viewing an American program on the Atari 800 computer and was interested when it started making statements about the PAL and NTSC television systems.

Could you please explain the differences between the two and why would this affect the Atari computer?

— Pamela Seymour, Warrington, Cheshire

■ The PAL system is one of the European television standards that use 50 Hz a 50 Hz frame rate and uses 625 lines per frame to build a picture on the screen.

The NTSC system is the American equivalent to PAL.

However, the program stated that it should allow your Commodore 64 to give you help on the matter? — Alexander Brock, Gwent, Hants, Cheshire

■ When searching through the summaries there is, as usual, a slow way and a quick way. The slow way is the most obvious—you start at the first entry number and continue until you find the one you're looking for.

This is an obvious way, but rather tedious. The very first routine I wrote that way if you were looking for a phone number in the directory would fail.

A much faster method is to scan the book in the middle and decide whether you've got to go forward or back. By looking at just one name you're already eliminated half the entry.

If you then turn up the middle of the section you now know the entry is in and again decide whether it's above or below the one you're seeking, and you'll have quartered the book and so on until you find the entry you're after.

Using this method the computer will find a great

many. I only need 250 lines per frame to build a picture and with a lower frame rate of 60 Hz.

This means that although the system is a dead faster in the American television the picture quality is not as good as that achieved by PAL.

Atari computers are actually designed around the NTSC system, but when they were sold in Europe a hardware modification was made so they would be compatible with the PAL system. So the difference in the way the two systems work will not directly affect your own system.

computer will find any number in a table of 1000 in less than a few seconds.

This system is often a better choice because it is a much faster way to search the summary. It is the standard. Searching is a tedious job, should have a problem searching up the search string and decoding for a friendly reply.

Right lines for fault

THANK you for a great magazine and thank you for my copy of *Sorting for Atari* software that I pass on your brother's computer. I am very pleased with it.

In the November 1987 issue of *Atari User* you published something for *Disorder* Cheshire.

After I had completed the first test the program was in the process of saving the actual value of some up with an ERROR # of 10.

Now after starting the 8010 I have a new error. Could you please help me? — Michael Davies, Wokingham, Essex

■ The error that you're getting is unexpected, but it is actually at line 3010, but it is not located between lines 3000 to 3099. You will eventually find that you have entered one or more of the data statements incorrectly. Check these lines very carefully and you should find your error.

Pin-outs in the 800XL

FOR a while now I have had an interest in the field of electronics and computers. I have built many of the projects that have appeared in *Atari User*. I don't have much to design and build my own hardware, but I am interested in the 800XL.

After you give me the explanations on the Atari 800XL, I have built many of the projects that have appeared in *Atari User*. I don't have much to design and build my own hardware, but I am interested in the 800XL.

I would appreciate it very much if you could help me. — Philip Marsh, Haverden, Cheshire

■ Here is a diagram of the pinouts for the 800XL 800XL connector.



Serial I/O pins

- 1 Clock input
- 2 Clock output
- 3 Data input
- 4 Ground
- 5 Data output
- 6 Ground
- 7 Command
- 8 Motor control
- 9 Floppy
- 10 +5Vdc
- 11 Audio input
- 12 +12 volts
- 13 Interrupt

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This fascinating adventure features the most sophisticated parser around! You can type complex sentences and interact with the many characters, including some very intelligent animals.

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– Anthony Glen, *Atari User*, May 1986



Guild of Thieves – it's a steal!

Guild of Thieves is the long-awaited follow-up to the award-winning adventure, The Pawn.

You're back in the fantasy world of Kerovnia, in the role of a novice thief who has applied to become a member of the illustrious Guild. To prove your worthiness you must ransack an island of all its treasures.

There are 29 beautiful illustrations, a massive vocabulary, and a text parser which is claimed to be more sophisticated than the parser in the Infocom adventures.

“This is an absorbing, funny and terrifying adventure and guaranteed to be another just-like winner for Rainbow.”

– Bob Chappell, *Atari User*, October 1987



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Atari 800/128 with 128K disc drive	The Pawn	Disc	£18.95	£14.95	£5	£24.95	£18
	Guild of Thieves	Disc	£18.95	£14.95	£5	£24.95	£18

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